

Founded in 1832

RAILWA

# LOCOMOTIVES AND CARS

JUNE 1957

One of Five Simmons-Boardman Railway Publications

formerly

RAILWAY  
Mechanical and  
Electrical Engineer

B&O DuBois  
Car Shop

Southern  
PS-1 Box Cars

Independent  
Passenger Car

Disassembling  
Traction Equipment

PROVIDE A COMPLETE DEVICE FOR SECURING LADING BANDS...

New

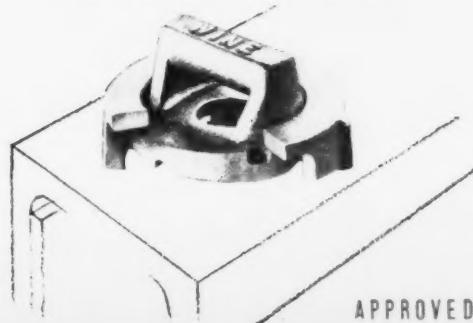


## Universal LADING BAND ANCHOR

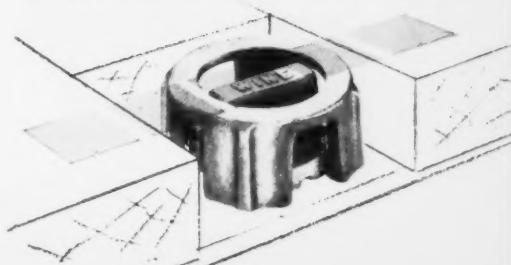
ROTATES 360 degrees

EASILY APPLIED  
ON ALL FLAT CARS  
AND GONDOLAS..

TOP COPING APPLICATION



DROPS FLUSH WHEN NOT IN USE



APPROVED BY A. A. R. AS AN ALTERNATE STANDARD

THE WINE RAILWAY APPLIANCE CO., TOLEDO 9, OHIO



## Diesel locomotives can now mix their fuels without incompatibility... thanks to FOA-2

As they travel across the country, diesel locomotives are, of course, refueled from a number of different stocks. The well-known incompatibility of many different fuels is a serious problem. And the increasing use of economy fuels makes it all the more serious. A *blend* of diesel fuels—even those which are individually quite stable—is often unstable.

To stabilize fuels, to minimize sludge, many leading railroads are using fuel oils containing Du Pont Fuel Oil Additive No. 2. Result: blends of cracked and straight-run stocks are made stable and kept stable. This remarkable additive itself is compatible with all types of diesel fuels.

### Filter and injector troubles prevented

FOA-2 is an excellent dispersant and solubilizer as well as stabilizer. When added to fuels containing insoluble residues, it minimizes the size of the particles comprising them. Hence the residues flow through the system and burn with the oil.

Because of this, FOA-2 improves the filterability of any diesel fuel stock, and prevents injector-sticking and filter-plugging.

### Ashless

FOA-2 will not contribute to exhaust-stack sparking because it is both non-

metallic and ashless. It does not form deposits—it *burns*.

It's economical, too, because only minute concentrations are required to provide stability. Addition of FOA-2 is simple and inexpensive. A Du Pont representative will be glad to explain to you in detail the use and advantages of Du Pont FOA-2.



# Petroleum Chemicals

**E. I. DU PONT DE NEMOURS & CO. (INC.)**—Petroleum Chemicals Division, Wilmington 98, Delaware

**900 MORE refrigerator cars**

**—all with HYATT HY-ROLL BEARINGS!**



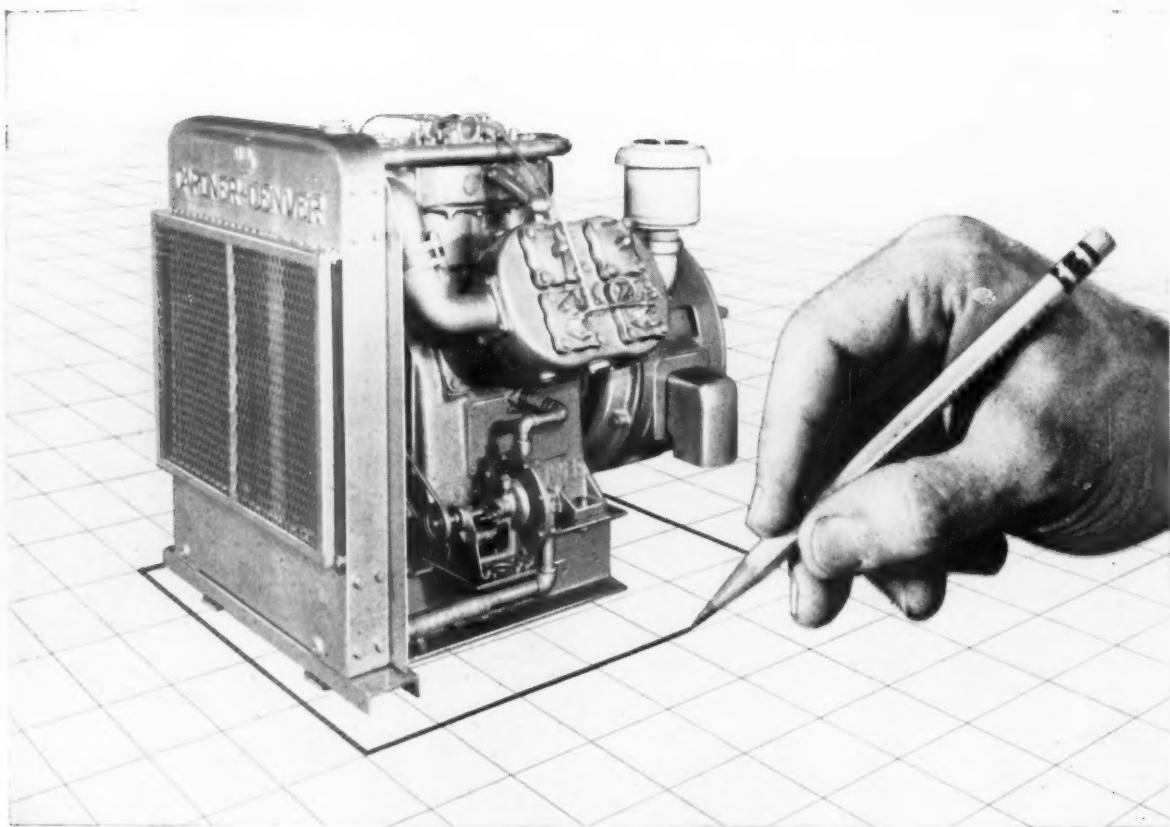
**"This is why we've ordered  
900 MORE refrigerator cars  
equipped with Roller Bearings"**

says Jno. C. Rill, President, Fruit Growers Express

"Flavor is a fleeting thing," says Mr. Rill, "so our constant aim is to provide faster, more dependable transportation for perishables and concentrates. That's why, three years ago, we made our first major investment in roller bearing refrigerator cars. The results have proved so satisfactory that we have now ordered 900 more cars equipped with roller bearings." All 900 roller bearing refrigerator cars ordered by Fruit Growers Express are 100% *Hyatt equipped*—another example of the high priority given Hyatt Hy-Roll Bearings in today's railroad modernization programs. Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.

Another  contribution to railroad prosperity

**HYATT HY-ROLL BEARINGS**  
FOR NON-STOP FREIGHT

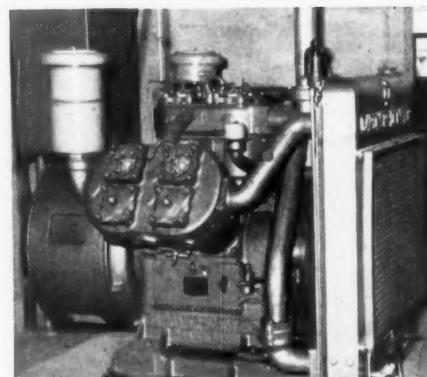


## SPACE PROBLEM?

**These compressors can help solve it**

With space around car and engine shops always at a premium, you can't afford to "bottle it up." Here is a compact source of air power you don't have to scratch your head to find a place for—a Gardner-Denver WB. You can get 686 c.f.m. in a 67" x 67" space. Take a look at the specifications:

Length	Width	Motor H.P.	Model
39"	47"	25	WBR
40"	52"	40	WBE
49"	52"	50	WBQ
56"	56"	75	WBH
67"	67"	100	WBK
67"	67"	125	WBJ
72"	68"	200	WBN



Gardner-Denver WB. Needs no special base—just bolt down, hook up and you have a steady, dependable source of air.



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# RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as  
the American Rail-Road Journal

JUNE, 1957

VOLUME 131, No. 6

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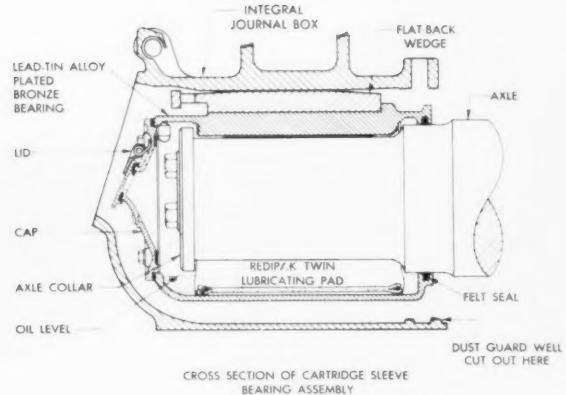
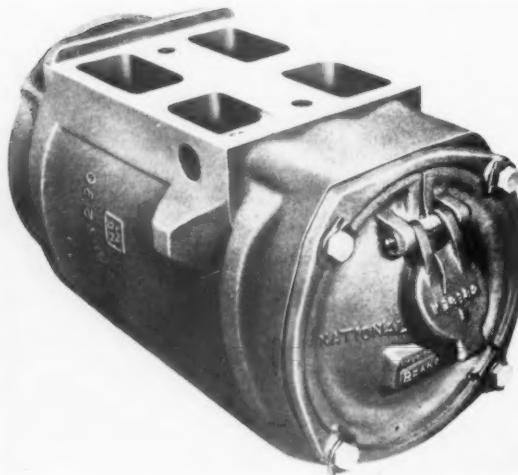
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## NEXT MONTH:

Pennsy's Big Box Cars  
Insulating Varnishes are Vital



Bearing housing (left) is leaded-bronze casting which fits into the standard journal box. Bearing is part of the inner surface of this casting, while oil reservoir is formed by its shape at the bottom (above).

### National Cartridge Bearing

Additional interchange service applications of the National Cartridge Bearing have recently been authorized by the AAR. After exhaustive laboratory testing by Brake Shoe, by the AAR's Chicago laboratory and after independent road tests by individual railroads, the AAR has now authorized the further trial of 800 car sets, making a total of 1,000 sets for interchange service.

The National Cartridge Bearing has been designed by American Brake Shoe to combine features of both solid and roller bearings. A completely sealed bearing and lubrication system in itself, the cartridge bearing is a precision sleeve bearing in its own integral housing, which contains oil reservoir and lubricating pad. It fits into the standard freight car integrally cast journal box, or can be used in pedestal type side frames.

In actual road tests since August 1955, the new cartridge bearings have successfully withstood today's freight service demands. A wheel car on the Great Northern running between Superior, Wis., and Minot, N.D., operated successfully under the severest of winter conditions. The car accumulated 15,000 miles of service, both loaded and empty, at temperatures below zero most of

the time and as low as 40 below repeatedly.

A Santa Fe car handling locomotive traction motors and generators between Cleburne, Tex., and San Bernardino, Cal., accumulated 40,000 car miles in the sand and heat of the southwest. The indicated oil consumption was 0.33 oz per 1,000 miles.

An Erie passenger coach was utilized to accumulate high mileage. Two cartridge units on this car have been in continuous service for 75,000 miles and 6 units for 40,000 miles. The coach has been in both main line and commuter service constantly. Despite the end thrust encountered on routes with high curvature, bearing performance has been excellent.

Inspection of disassembled cartridge units after all of these tests disclosed no measurable wear. Chemical analysis of oil samples taken after test showed that the seal effectively prevents moisture, dust, dirt, or other foreign substances from getting into the bearing. Maximum oil consumption, even under the worst test conditions, was no more than 0.4 oz per 1,000 miles. Road tests confirmed findings of Brake Shoe's bearing research laboratory where every extreme of

climate, speed, and misalignment can be duplicated. Development of the new cartridge bearing had started in 1953.

The new cartridge bearing is cast of a high-strength leaded bronze, and plated with a lead-tin alloy lining of the type used in diesel engine crankshaft and connecting rod bearings. The oil reservoir, in which the lubricating pad is placed and the rear seal housing are cast integrally with the bearing.

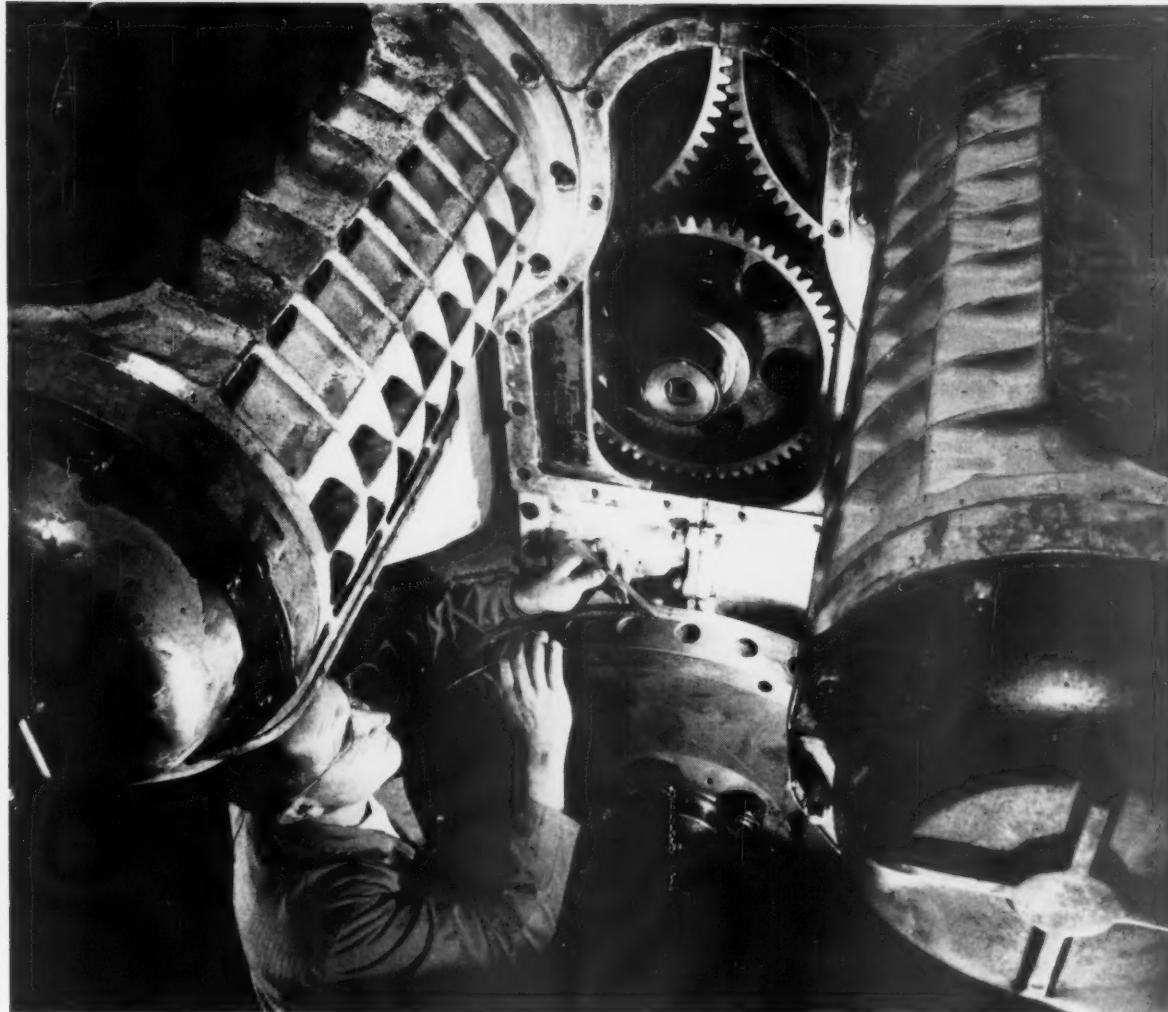
A single felt ring, lubricated for low friction and long life, makes the seal. It rides on the conventional axle dust guard seat. The front cover is bolted on and has an oil level inspection opening with self-closing lid. The wedge is an approved type adapter. With the flat back adapter there is no movement of the bearing from accelerating or decelerating forces.

Just enough free and snubbed lateral movement has been designed into the cartridge bearing to minimize damaging impact on truck side frames and bolsters. Controlling the lateral movement also prevents the seal ring from riding off the axle dust guard seat. However, there is sufficient lateral so the sleeve can move in and out slightly on the axle, lubricating the entire journal surface under all conditions.

(Continued on page 8)

## ENGINEER'S FIELD REPORT

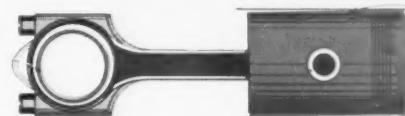
PRODUCT RPM DELO OIL RR  
FIRM NORTHERN PACIFIC RAILWAY  
South Tacoma, Wash.



### RR diesel gears show only $\frac{1}{2}^{\circ}$ wear in $2\frac{1}{2}$ million miles

Timing gears on this Northern Pacific GMC-diesel locomotive engine, lubricated with RPM DELO Oil RR, recently completed  $2\frac{1}{2}$  million miles of severe freight service without repairs or adjustment. NP's South Tacoma Shop Foreman, A. R. Genin (above), indicates degree marks on engine flywheel, used to gauge gear wear. Tolerance between gear teeth shows variance of just  $\frac{1}{2}^{\circ}$  from original setting. Mr. Genin says, "We consider this low rate of wear remarkable for heavy-duty freight operation. It is typical of our experience during the 12 years we have used RPM DELO Oil in all our locomotive diesels." Engines are 1350 h.p. 16-567 series.

#### Why RPM DELO Oil RR reduces wear, corrosion



- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists foaming



TRADEMARK "RPM DELO" AND  
DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso  
THE CALIFORNIA COMPANY, Denver 1, Colorado

## At work on the



No. 3—five electrode model, for high production positions—the real workhorse of the trade. Other models for heating two and three rivets at a time.

### THE B&O USES CHESTON ELECTRIC RIVET HEATERS AT DU BOIS

In its busy shops at DuBois, the Baltimore and Ohio Railroad uses Cheston Electric Rivet Heaters because of the great economy and convenience built into our equipment . . . and because the cool, clean, quiet and entirely modern operation of the Cheston Heater is right for an up-to-date shop, and good for B&O employees.

The Cheston Rivet Heater is ready to go to work whenever . . . and wherever . . . the job is ready, and produces heated rivets within seconds of starting up. There is no waiting time loss while rivets come up to heat . . . no pre-heating ex-

pense before the shift begins . . . no fuel waste during idle periods. With a Cheston Rivet Heater there is no heat blast . . . blower roar . . . smoke . . . fumes . . . or grime. There is no fire hazard, as open hearths and fuel lines and stores are eliminated. No compressed air is required, so the air now lost to your blast type heaters is added to your tools for better quality work. Operating cost of a Cheston Rivet Heater averages out to about 15 cents per 100 lbs. of rivets heated. These features have made good sense to the B&O, and to scores of other railroads, large and small.

CHESTON ELECTRIC RIVET HEATERS  
MAKE THE BEST SENSE FOR YOU, TOO.  
WRITE FOR DETAILS TODAY.

## Frank C. Cheston Company

60 PARK PLACE

NEWARK 2, NEW JERSEY



## EQUIPMENT

(Continued from page 6)

Installing the new cartridge bearings requires no special shop equipment or training. Because the cartridge is a sleeve bearing, the axle collar is cut off so the sleeve can be slipped over the journal. Three holes are drilled and tapped in the end of the axle so the cartridge can be secured by a new removable collar held by cap screws.

The cartridge fits into the journal box after the dust guard well flanges have been cut off with a torch. A saturated lubricating pad is placed in the cartridge before it is installed, then it is slipped on the journal, and the adapter positioned atop the bearing. The front cover is bolted on, and oil to the proper gage level added to the reservoir through the self-closing filler cap. Since the cartridge bearing has its own cover, the standard journal box lid is not used.

Cartridge bearings can be inserted in journal boxes at the wheel shops, where complete wheel, axle and cartridge sets can be made up in advance for assembly into trucks. At present Brake Shoe recommends an oil check and refilling if necessary after every 3,000 miles. Bearing surface, journal and lubricating pad can be inspected at wheel turning.

Besides aiming at elimination of the hot box problem, the new bearing has the added advantage of economy. Initially, it costs less than any type of roller bearing assembly, Brake Shoe claims. Cartridge bearings can be produced at lower cost primarily because each bearing is essentially an integral bronze casting and not an assembly of many critical parts.

Since cartridge bearings require infrequent service attention, eliminate waste grabs, and conserve oil, they substantially reduce operating costs. Finally, cartridge bearings have a low replacement cost because of their high salvage value. Over 75 per cent of the total weight of the unit is the bronze cartridge casting. The same toll return of scrap, now used for standard AAR journal bearings, will apply to cartridge bearings.

American Brake Shoe is currently producing the new cartridge bearings in its St. Louis, Mo., and Meadville, Pa., plants. Seven railroads

(Continued on page 10)



**how 75 ton  
BROWNHOIST  
combination crane  
will greatly increase  
GALVESTON  
port facilities**

The latest type combination boat-unloading crane being engineered and built by Industrial Brownhoist in Bay City, Michigan will substantially improve facilities in the Port of Galveston's 1957 expansion program.

This big, fast-working Brownhoist crane loads or unloads bulk materials from ship-to-cars or cars-to-ship at the remarkable rate of 540 tons per hour! Equipped with 75 foot boom, on which travel both a hook and a Brownhoist-made, 80 cubic foot flush link-type bucket. The entire unit straddles three railroad car tracks located on the pier.

In addition to boat unloading equipment and material handling bridges, Industrial Brownhoist manufactures Diesel-Electric locomotive cranes from 25 to 90 tons, and railroad cranes up to 250 ton capacities. If your firm can profit from reliable, high-speed, high-capacity material-handling equipment, write for new general Catalog No. 562.

201

**BROWNHOIST**



CLAMSHELL BUCKET 250 TON WRECKING CRANE



COAL ORE BRIDGE



CAR DUMPER



LOCOMOTIVE CRANE

**INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN** • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal, Canada • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF





Heavy loop pile surfaces designed for easy application front and removal . . . special unsized duck casing. REINFORCED SIDING TO WITHSTAND EXTRAORDINARY WEAR AND TEAR.

100% wool-batt core . . . quilted construction to assure stability . . . available in two sizes: 9-10 for 9" and 10" AAR standard journal boxes and 11-12 for 11" and 12" standard boxes.

## A POSITIVE ADVANCE IN JOURNAL LUBRICATION

- CANNOT POSSIBLY GLAZE!
- Contains an UNUSUALLY LARGE OIL RESERVOIR.
- IS UNAFFECTED BY TEMPERATURE CHANGES.
- IS RECLAIMABLE!
- HAS EXCEPTIONAL WICKING and FILTERING qualities.

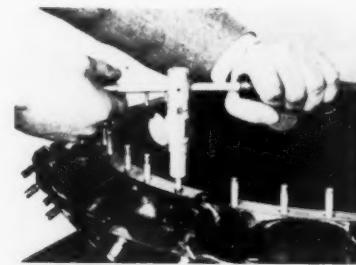
## JOURNAL BOX SERVICING CORPORATION



## EQUIPMENT

(Continued from page 8)

already have the new cartridge bearings on trial or on order, their requirements ranging from bearings for single car tests to orders for more than 100 cars. *American Brake Shoe Company, Railroad Products Division, Dept. RLC, 230 Park Ave., New York 17.*



### Stud Driver-Extractor

The Bi-Way Studding, a double-duty extractor and driver for hand or power operation, is said to salvage more than five times as many studs in undamaged condition as comparable tools. Collet sizes are changed in less than 30 sec. Interlocking construction was adopted to prevent accidental misalignment, to seal out dirt, and to provide reliable operation.

In extracting, only the required clamping action to release the stud is produced to prevent stripping the thread. Lowering the shift control and reversing the direction of the rotation furnishes the driving action. Serrated collets are available to remove damaged studs, even if only as little as  $\frac{1}{8}$  in. of the stud can be gripped.

Removal of the handles converts this studding to power operation. Tool will accept all standard drive hand, torque, air, or electric impact wrenches with controlled impact. Extension shafts may be used for difficult applications. *E. V. Nielsen, Inc., Dept. RLC, 128 Broad St., Stamford, Conn.*

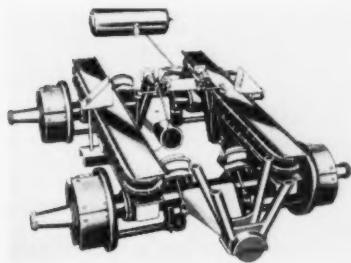


### Self-heating Iron

A self-heating soldering iron is available in this cartridge heated tool called the Quik-Shot. A small cartridge when activated by a plunger in the handle, produces an excess of 800 deg F in the copper tip, providing 6 min of soldering time.

The manufacturer recommends this

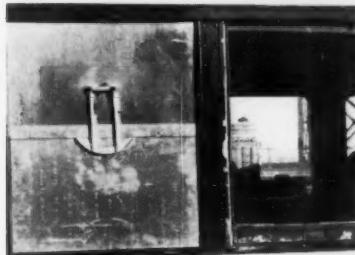
tool for work where no electric current is available or not convenient. A 1-in. chisel tip as well as four smaller-sized tips are offered. All tips are interchangeable and take the same cartridge. Kemode Manufacturing Company, Inc., Dept. RLC, 161 W. 18th st., New York 11.



### Air Spring Suspension Unit

The Yocar AiRide, a new air spring suspension unit for truck-trailers, is a Youngstown Steel Car design. The first model—a tandem—incorporates several engineering advances designed to lighten the suspension unit by a considerable amount over conventional rigs.

The Yocar AiRide has an automatic compensating system which maintains axle-to-trailer floor height regardless of load or road conditions. The manufacturers say this feature alone, by reducing cost of running-gear maintenance and lowering damage freight claims, provides truckers with a long sought-after means of lowering operating costs. *Youngstown Steel Car Corporation, AiRide Division, Dept. RLC, Niles, Ohio.*



### Window Mask

This paint-spraying mask or shield for railroad car windows eliminates the use of tape and is said to reduce preparation time to less than one minute. Standard size shields are stocked, and nearly any size can be ordered, also a modified style for rubber-mounted windows.

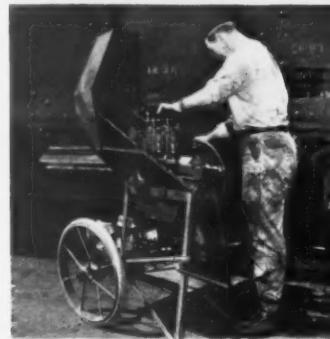
These self-adjusting masks of hard stock aluminum come in individual reinforced cartons, identified by type and size. *O'Neill Spray Shield Company, 1719 South 18th st., Dept. RLC, Philadelphia 45.*

(Turn to page 76)

RENT or BUY . . .

### THE FAMOUS JBS BRASS TRIMMER

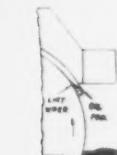
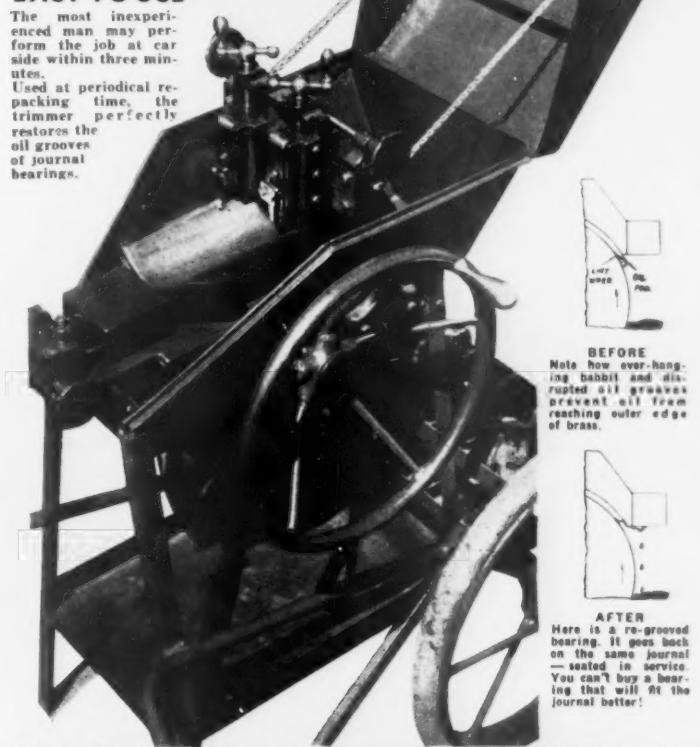
SAVES \$5.00 ANNUALLY PER CAR\*



Many years of service records verify even greater savings!

### EASY TO USE

The most inexperienced man may perform the job at car side within three minutes. Used at periodical re-packing time, the trimmer perfectly restores the oil grooves of journal bearings.



BEFORE  
Note how over-hanging babbitt and disrupted oil grooves prevent oil from reaching outer edge of brass.



AFTER  
Here is a re-grooved bearing. It goes back on the same journal — seated in service. You get a bearing that will fit the journal better!

### BEARINGS BETTER THAN NEW! ELIMINATES CRUCIAL BREAK-IN PERIOD

Trimming and reapplication to the journal from which removed results in the perfectly FITTED BEARING and eliminates the hazard of failure during the otherwise crucial break-in period of a new bearing.

#### AAR APPROVED

The trimming of bearings has been approved as a CHARGEABLE ITEM on cars in interchange.

### JOURNAL BOX SERVICING CORPORATION

35 Years in Car Lubrication  
Sales Office: 332 S. Michigan Ave., Chicago 4, Ill.  
General Office: 1113 E. Keweenaw Blvd., Indianapolis 20, Ind.

## Mechanical Division Convenes June 25-27

The Mechanical Division, Association of American Railroads, will hold its 1957 convention at the Hotel Sherman, Chicago, June 25-27. Daylight Saving Time will be observed for the various sessions, the program for which follows.

TUESDAY, JUNE 25  
10 am

Joint session: Mechanical Division and Electrical Section of the Mechanical and Engineering Divisions, addressed by J. W. Barringer, president, Pittsburgh & Lake Erie, and R. G. May, vice-president, Operations and Maintenance Department, AAR.

Address: C. E. Pond, general superintendent motive power, Norfolk & Western.

Action on Minutes of 1956 annual meeting.

Appointment of Committees on Subjects, Resolutions, etc.

Unfinished business.  
New business.  
Reports of General and Nominating Committees.  
Discussion of reports on:  
Locomotives.  
Lubricants and Fuel for Diesel Locomotives.  
Axles.  
Geared Hand Brakes.  
Specifications for Materials.  
Safety Appliances.

WEDNESDAY, JUNE 26  
9:30 am

Address: R. H. Smith, president, Norfolk & Western.  
Discussion of reports on:  
Arbitration.  
Prices for Labor and Materials.  
Car Construction.  
Brakes and Brake Equipment.  
Cougars and Draft Gears.

Loading Rules.  
Forest Products Loading.

THURSDAY, JUNE 27  
9:30 am

Address: Kenneth H. Tugle, member, Interstate Commerce Commission.

Discussion of reports on:  
Wheels.  
Tank Cars.  
Journal Roller Bearings.  
Lubrication of Cars and Locomotives.

Election of members of General Committee and Committee on Nominations.  
Report of Committee on Resolutions.

## ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE MAY ISSUE

### FREIGHT-CAR ORDERS

Road and Builder	No. of Cars	Type of Car	Cap., Tons	Other detail
BALTIMORE & OHIO: Bethlehem Steel	2,000	Hopper	70	For delivery late 1957 and early 1958.
CHICAGO & EASTERN ILLINOIS: Bethlehem Steel	50	Gondola	—	Length, 65 ft. Cost, about \$500,000. Delivery expected first quarter 1958.
COTTON BELT: Bethlehem Steel	50	Gondola	70	Estimated cost, \$450,250. For January delivery.
Pullman-Standard	100	Covered hopper	70	Estimated cost, \$953,500. For October delivery.
FLORIDA EAST COAST: Major Car	150	Gondola	70	For delivery first quarter 1958.
ACF Industries	50	Hopper	70	Both types of hoppers for delivery fourth quarter 1957.
Pullman-Standard	55	Covered hopper	70	Purchase of these 255 cars subject to court order.
NORTHERN PACIFIC: Company shops	500	Box	50	Length 50½ ft. with 15-ft. double doors. Estimated cost, \$4,325,000. For delivery about next March.
	500	Box	50	Length, 40½ ft., with 6-ft. doors. Estimated cost, \$4,075,000. For delivery about July or August 1958.
SEABOARD AIR LINE: Company shops	10	Box	—	Specially designed with 20-ft doors for handling packaged lumber. Delivery expected before end of year.
SOUTHERN: Pullman Standard	1,200	Gondola	70	—
	200	Box	50	"Premium type."
	600	Covered hopper	70	—
ACF Industries	500	Hopper bottom coal	70	—
Greenville Steel Car	100	Drop-end gondola	70	—
General American	50	Covered hopper	70	"Airslide."
UNION PACIFIC: General American	100	Covered hopper	70	"Airslide."
UNION TANK CAR CO.: Company shops	10	Tank	—	10,000 gal. For delivery fourth quarter 1957.
WABASH: Bethlehem Steel	100	Gondola	70	For January delivery.
Greenville Steel Car	50	Covered hopper	70	For June delivery.

### DIESEL LOCOMOTIVE ORDERS

Road and builder	No. of Horse-power	Service	Other Detail
PENNSYLVANIA: Electro-Motive	50	1,750 All-purpose freight	Approximate cost, \$9,750,000. Delivery to be completed by October.

### NOTES AND INQUIRIES

LOCOMOTIVES: Pennsylvania: Purchased seven retired electric locomotives from the Great Northern. All of Y-1 class, rated at 3,300 hp.

## AIEE Summer General Meeting

Sessions on Suburban Electrification and Land Transportation are among those on the calendar for the Summer General Meeting of the American Institute of Electrical Engineers to be held at the Sheraton Mount Royal Hotel, Montreal, June 24-28. The papers to be presented at these two sessions are as follows.

MONDAY, JUNE 24  
9 am

### Land Transportation

Description and Maintenance Procedures of Electrical and Air-Conditioning Equipment on Canadian Pacific Stainless-Steel Passenger-Car Equipment, A. E. McGruer, Canadian Pacific.

Rehabilitation of Diesel-Electric Locomotive Electrical Equipment, T. H. Murphy and R. L. Bogardus, Westinghouse Electric Corp.

A New Void-Free, Class "H" Insulation System for Traction Motor Field Coils, G. L. Moses, Westinghouse Electric Corp., and S. MacBeth, Canadian Westinghouse Co.

Multiple-Unit Rectifier Motive Power Inductive-Coordination Considerations on the New York, New Haven & Hartford, L. J. Hibbard, Westinghouse Electric Corp., F. T. Garry, Southern New England Telephone Co., and G. N. Loomis, New Haven.

TUESDAY, JUNE 25  
9 am

### Suburban Electrification

Symposium on Electrification of Railway Commuter Service:

Part I—Problems Confronting Railway Commuter Service, T. F. Perkins, General Electric Co.

Series Capacitors Applied to Rectifier Motive Power Units, L. J. Hibbard and T. J. Bliss, Westinghouse Electric Corp.

Part II—Factors Influencing Future (Continued on page 14)

**Name  
the load  
on your  
road**



**there's a  
*Yellow Strand*.  
**Safety Sling to  
handle it!****

Any load you have to handle is a load for Yellow Strand Braided Safety Slings.

Yellow Strand Braided Safety Slings are strong, flexible, easy to attach. Special braiding methods keep safety factors high. High-quality Yellow Strand Wire Rope assures longer life.

They can be tailor-made to specifically fit your needs. Just ask your Broderick & Bascom distributor, or write direct to us for specific sling information.

Diesel switch engine is safely and easily lifted with four M-1-AB Yellow Strand Braided Slings; each sling is 8 parts  $\frac{3}{4}$ " rope, 14 feet long.

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## NEWS

(Continued from page 12)

Electrification of Railway Commuter Service, H. F. Brown, Gibbs & Hill, Inc. Conclusion—J. Stair, Jr., Pennsylvania.

2 pm

### Land Transportation

Mercury-Arc Rectifiers in Urban Transportation, J. T. Harvey, Toronto Transit Commission.

Comparison of Aluminum and Steel Subway Cars, L. W. Bardsley, Toronto Transit Commission.

Ore haulage on the Quebec, North Shore & Labrador, J. H. Miller, QNS&L. With motion pictures.

### NYC Reveals Gas-Turbine Research

A closed cycle gas turbine—a third candidate for future locomotive prime movers—has successfully operated with a thermal efficiency of 21 per cent at the New York Central's newly opened research laboratory at Cleveland, according to J. J. Wright, NYC's director of technical research. "If we are lucky, it will be in a locomotive in 25 weeks," predicted Mr. Wright in summarizing the present test-stand operation. Other competitors in this prime mover race, according to Mr. Wright, have been the open-cycle gas turbine of the Locomotive Development Committee and General Motor's free piston power plant.

The NYC power plant uses Freon as the working fluid and consists of a pressurized shell containing the turbine and generator, along with the separate external heat exchanger and a condenser. At the time of the laboratory opening, the power system had produced a shaft output of only 40 hp, with work still in early stages. At present it is being fired with diesel oil to avoid fuel complications, but the heat exchanger presents the possibility of using almost any grade of

(Continued on page 91)

## Personal Mention

### Chicago & Northwestern Chicago

C. C. EHLERT appointed chief mechanical engineer.

F. R. MARVIN has been appointed assistant diesel supervisor with headquarters at Chicago.

LEE N. HASKINS appointed assistant diesel supervisor.

### Elgin, Joliet & Eastern

V. K. MILLER appointed industrial engineer, Chicago.

B. E. LEWIS appointed master mechanic, Gary, Ind.

(Continued on page 64)

### SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.	Month of February		2 months ended with February	
	1957	1956	1957	1956
3 Road locomotive miles (000) (M-211):				
3-05 Total, steam	2,163	4,113	4,733	8,712
3-06 Total, Diesel-electric	34,260	35,696	71,286	72,780
3-07 Total, electric	679	704	1,394	1,440
3-08 Total, locomotive-miles	37,329	40,731	77,904	83,374
4 Car-miles (000,000) (M-211):				
4-03 Loaded, total	1,501	1,623	3,071	3,287
4-06 Empty, total	873	876	1,803	1,833
6 Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01 Total in coal-burning steam locomotive trains	5,948	10,048	12,725	20,895
6-02 Total in oil-burning steam locomotive trains	128	962	363	2,372
6-03 Total in Diesel-electric locomotive trains	100,123	101,626	204,261	206,189
6-04 Total in electric locomotive trains	2,055	2,128	4,179	4,313
6-06 Total in all trains	109,093	115,519	223,321	235,295
10 Averages per train-mile (excluding light trains) (M-211):				
10-01 Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10-02 Loaded freight car-miles	42.9	42.8	42.1	42.4
10-03 Empty freight car-miles	25.0	23.1	24.7	23.6
10-04 Total freight car-miles excluding caboose	67.9	65.9	66.8	66.0
10-05 Gross ton-miles (excluding locomotive and tender)	3,119	3,047	3,059	3,032
10-06 Net ton-miles	1,412	1,399	1,384	1,384
12 Net ton-miles per loaded car-mile (M-211)	32.9	32.7	32.9	32.7
13 Car-mile ratios (M-211):				
13-03 Per cent loaded of total freight car-miles	63.2	64.9	63.0	64.2
14 Averages per train hour (M-211):				
14-01 Train miles	18.8	18.6	18.8	18.7
14-02 Gross ton-miles (excluding locomotive and tender)	58,132	56,074	56,889	56,051
17 Car-miles per freight car day (M-240):				
17-01 Serviceable	45.8	46.9	44.7	46.4
17-02 All	44.1	45.0	43.0	44.5
18 Average net ton-miles per freight car-day (M-240)	918	955	890	934
20 Per cent of home cars of total freight cars on the line (M-240)	43.3	41.7	43.6	41.9

PASSENGER SERVICE (DATA FROM I.C.C. M-213)

3 Road motive-power miles (000)				
3-05 Steam	300	806	717	1,806
3-06 Diesel-electric	18,024	19,374	38,312	40,114
3-07 Electric	1,110	1,222	2,369	2,545
3-08 Total	19,434	21,403	41,398	44,466
4 Passenger-train car-miles (000):				
4-08 Total in all locomotive-propelled trains	198,220	218,767	420,518	454,057
4-09 Total in coal-burning steam locomotive trains	2,292	4,813	5,404	10,706
4-10 Total in oil-burning steam locomotive trains	34	1,822	193	4,345
4-11 Total in Diesel-electric locomotive trains	182,252	197,022	386,349	408,879
12 Total car-miles per train-mile:	9.70	9.80	9.68	9.80

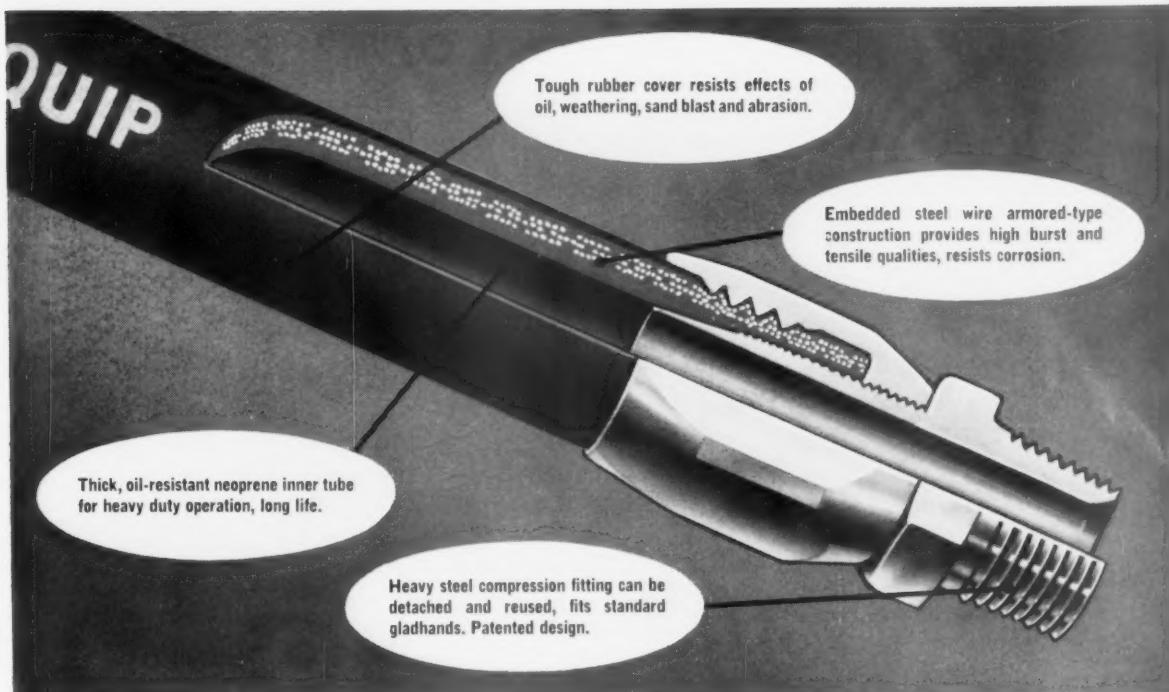
YARD SERVICE (DATA FROM I.C.C. M-215)

1 Freight yard switching locomotive-hours:				
1-01 Steam, coal-burning	156,238	243,213	336,757	502,805
1-02 Steam, oil-burning	5,379	25,717	13,250	54,650
1-03 Diesel-electric <sup>1</sup>	3,554,874	3,738,334	7,483,799	7,633,514
1-06 Total	3,719,183	4,010,171	7,839,941	8,196,976
2 Passenger yard switching hours				
2-01 Steam, coal-burning	4,032	6,465	8,846	14,185
2-02 Steam, oil-burning	119	2,285	804	5,625
2-03 Diesel-electric <sup>1</sup>	228,448	238,842	485,245	490,912
2-06 Total	255,106	272,604	543,174	562,218
3 Hours per yard locomotive-day:				
3-01 Steam	5.8	6.0	6.0	6.0
3-02 Diesel-electric	15.7	16.2	15.6	15.9
3-05 Serviceable	15.9	16.2	15.9	16.0
3-06 All locomotives serviceable, unserviceable and stored	14.6	14.5	14.6	14.3
4 Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.71	1.71	1.76	1.72
5 Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.79	.79	.79	.76

<sup>1</sup> Excludes B and trailing A units

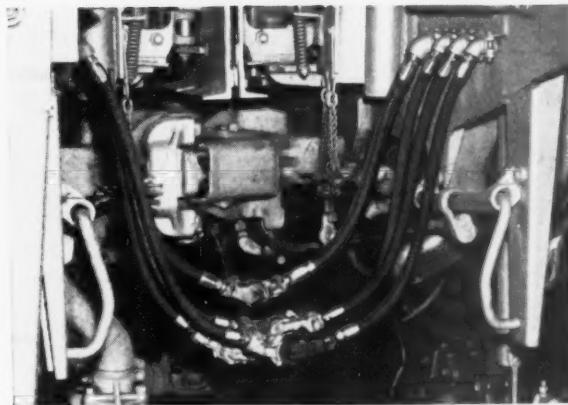
### SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
February, 1953	2,625,563	2,111	4,059	6,170	425,537
February, 1954	2,445,215	2,953	4,066	7,019	348,370
February, 1955	2,517,483	2,266	3,970	6,236	403,701
1956					
January	2,925,109	2,029	4,302	6,331	462,029
February	2,794,161	2,570	5,611	8,181	341,542
March	3,027,684	2,517	6,212	8,729	346,853
April	2,930,389	3,202	6,881	10,083	290,626
May	3,063,427	4,672	10,903	15,575	196,688
June	2,973,732	6,777	15,125	21,902	135,774
July	2,788,347	8,484	16,067	24,551	110,573
August	3,039,173	9,891	16,892	26,783	113,474
September	2,918,875	6,834	12,629	19,463	149,970
October	3,113,460	4,357	8,429	12,786	243,505
November	2,953,625	2,650	5,560	8,210	359,759
December	2,933,940	2,256	4,436	6,692	438,425
1957					
January	2,767,060	3,373	6,121	9,494	291,453
February	2,675,265	3,272	6,844	10,113	264,538



## Use Aeroquip Air Brake Hose Lines

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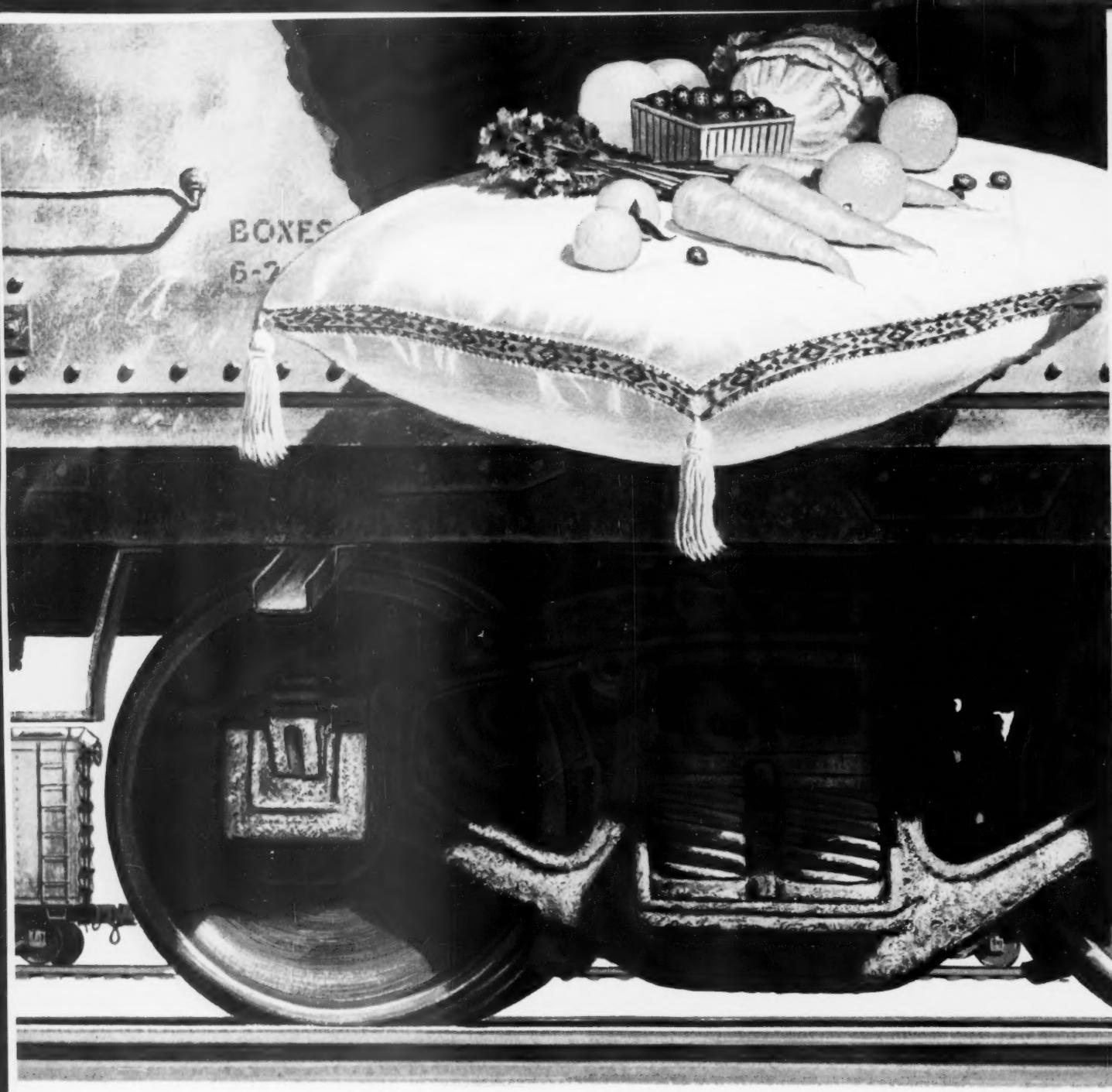
**Reduce Inventory**—With Aeroquip, your air brake hose line inventory is reduced to a few coils of bulk hose and some reusable fittings in your maintenance shops.

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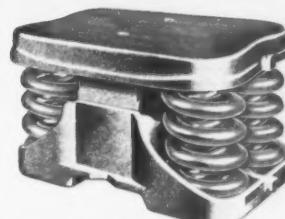


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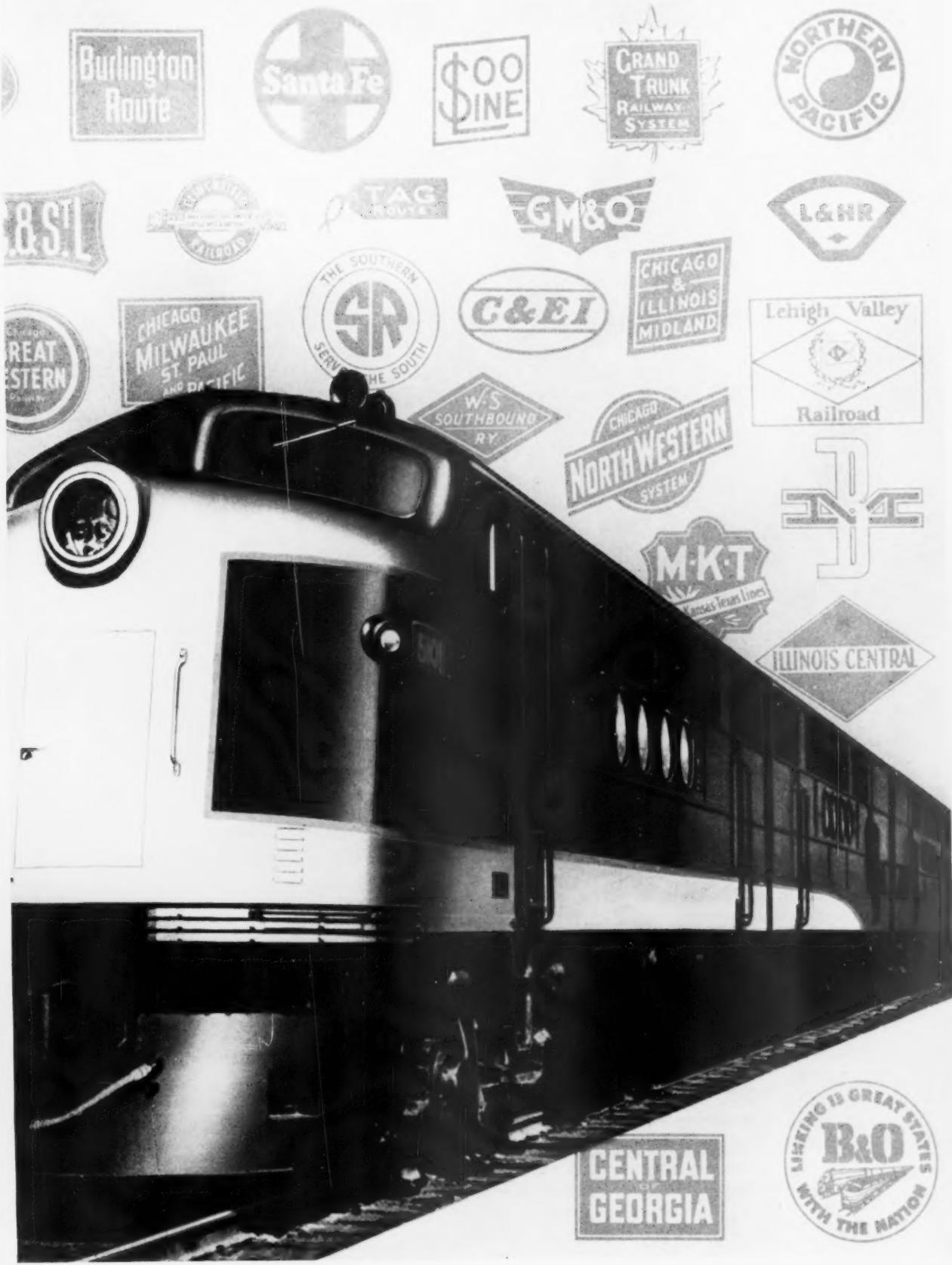
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**"These channels actually cool the battery"**

*At the Exide Laboratories—***Reporter:** First, Mr. White, tell me what makes a battery hot.

**White:** Heavy loads—they often raise battery temperature as much as 20 degrees.

**Reporter:** How do the channels cool it?

**White:** The heated electrolyte rises to the top through the channels. Plates are cooled by electrolyte coming up from the bottom.

**Reporter:** Don't all batteries have channels?

**White:** Unfortunately, no. It is the tubular construction of the Exide-Ironclad positive plate that leaves these channels on both sides.

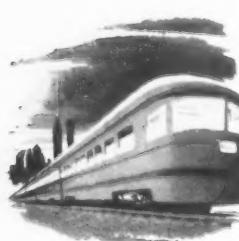
**Reporter:** What does this feature mean in battery performance?

**White:** Longer battery life, for one thing. The battery stays cooler. Has less incidence of hot spots. Plates operate at a more uniform temperature.

**Reporter:** Obviously this is an important feature of Exide-Ironclad.

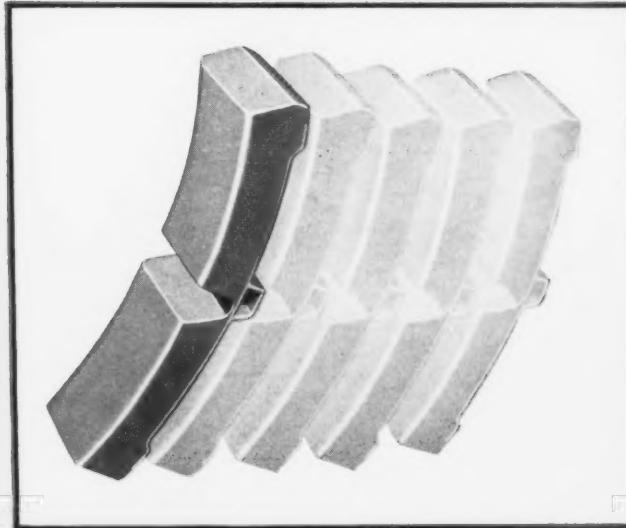
**White:** Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

**Note to battery users:** Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.

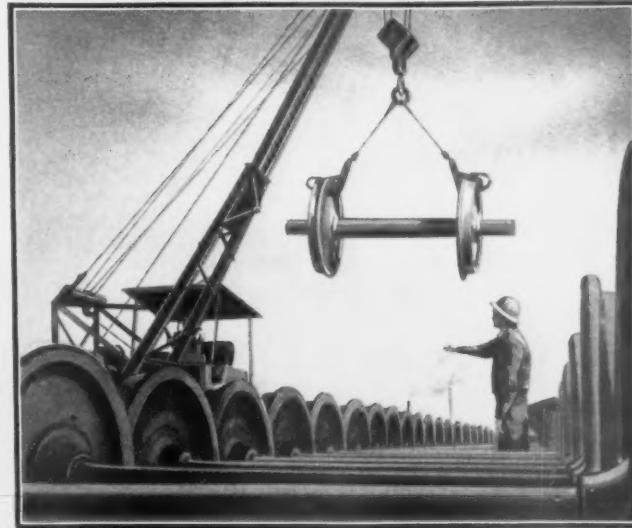


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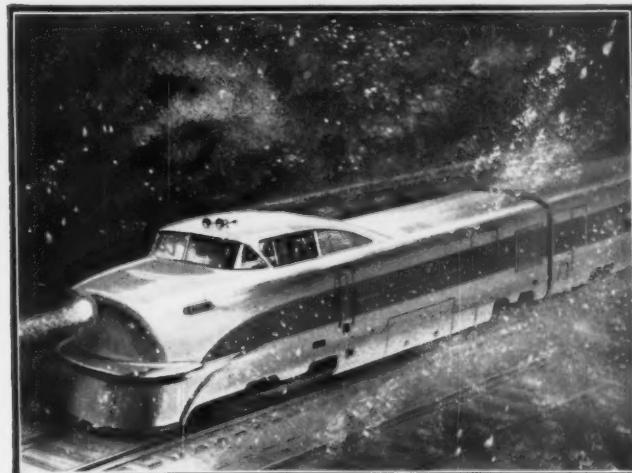
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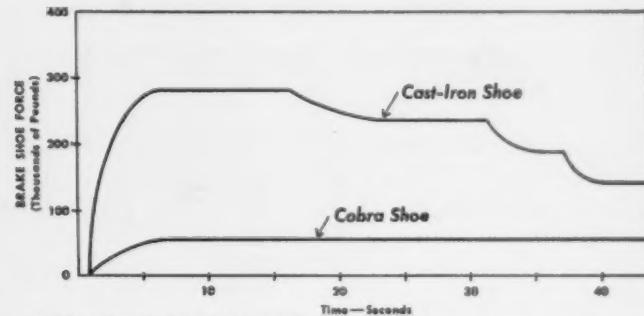


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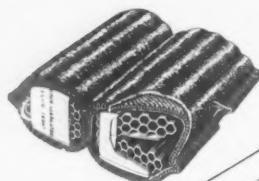
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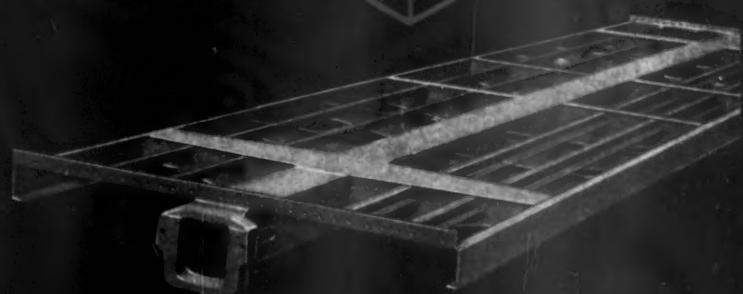
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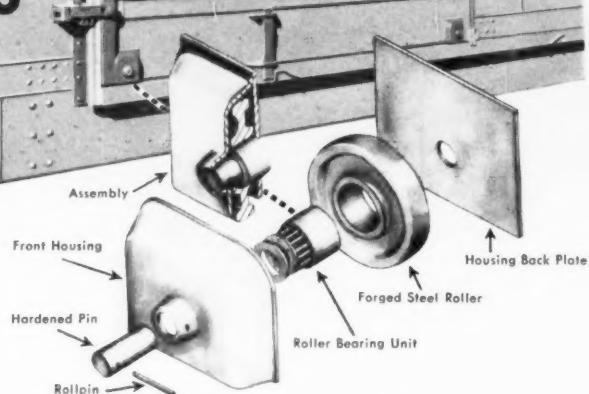
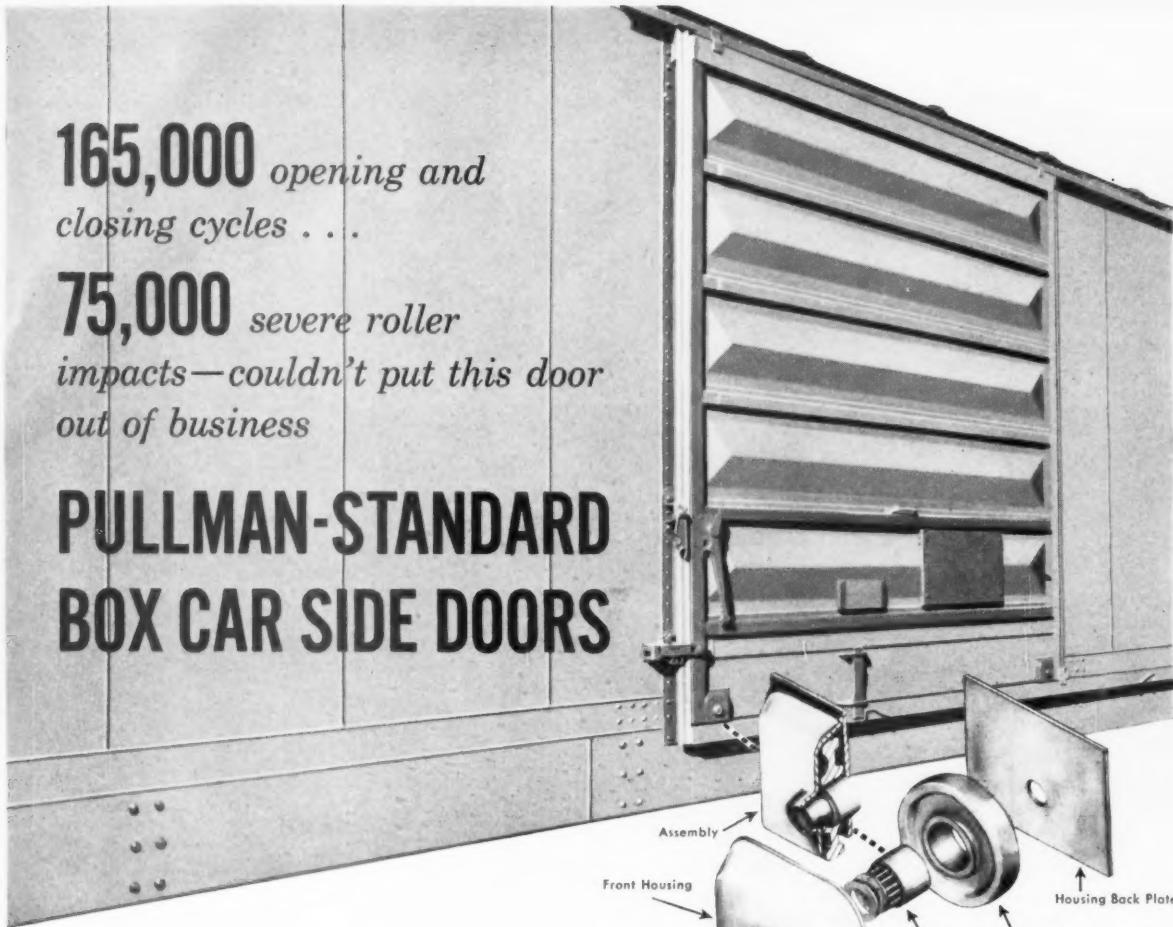
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- Heavy-duty lower combination panel and framing member of  $\frac{3}{4}$ " corrosion resistant, copper bearing steel to withstand loading dock abuse.
- Other panels of .10-inch corrosion-resistant copper-bearing steel. Fixtures of forged or cast steel to withstand service abuse. All parts can be repaired by welding if accident damaged.
- 5" rollers with durable cage type roller bearings insure trouble-free, easy operation.
- Precision fabricated, embossed for strength.
- Corrosion pockets eliminated by welding assembly.
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Over nine years ago, Pullman-Standard, the world's largest carbuilder, began the development of the P-S Box Car Side Door. Extensive field research determined the loading protection qualities, durability requirements and minimum maintenance features that shippers and railroads demand. P-S freight car engineering and production specialists applied these performance demands to the design and precision fabrication of this outstanding door now offered America's railroads.

Exhaustive laboratory and in-service tests have proved that the P-S Box Car Side Door exceeds even the rigorous demands that the Great American Railway System must make for top performance. One continuing laboratory test of the door roller mechanism and door track has put the P-S door through 165,000 opening and closing cycles. Another subjected the rollers and bearings to over 75,000 individual heavy impacts. Result: not a damaged bearing, rollers were still "in-round," door track was groove-free and door action remained smooth and easy.

Complete details and specifications on the P-S Box Car Side Door are available from your nearest Pullman-Standard Sales Office or by writing to the address below.

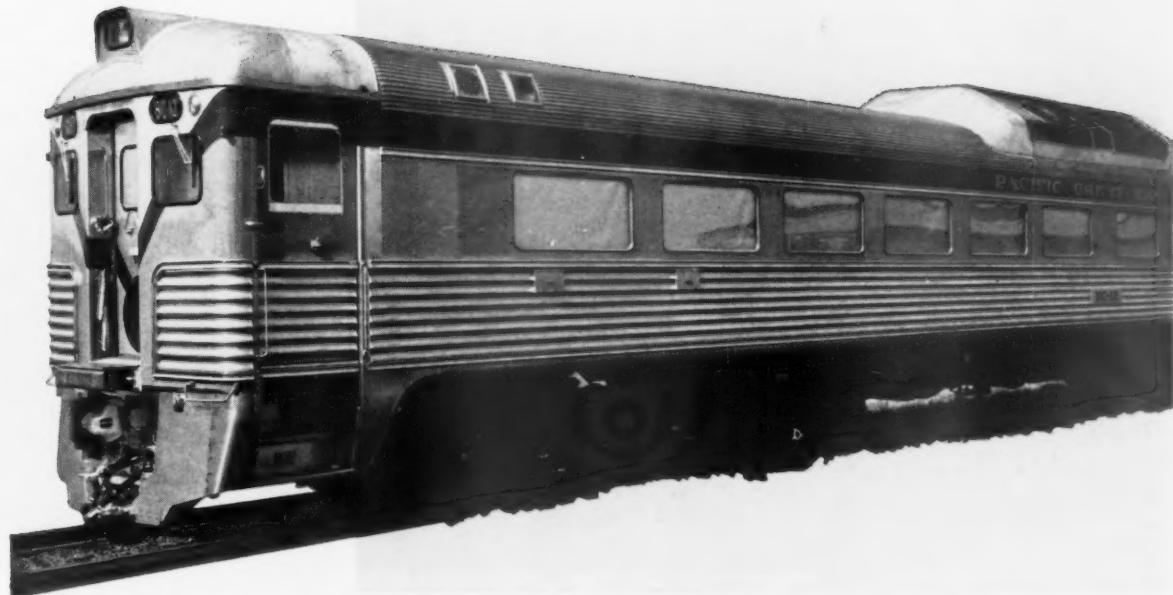
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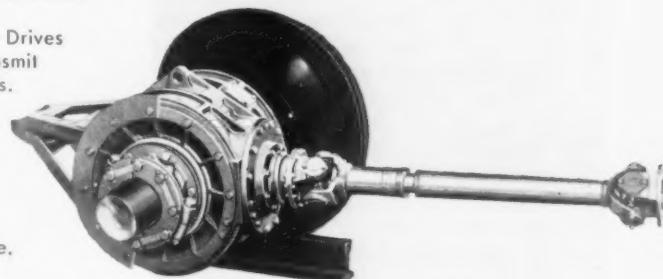
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The Spicer Drive is a self-contained unit employing ground spiral bevel gears, with all wearing parts running in a constant bath of oil, completely sealed and protected from ballast, dirt, water, snow, etc., for long life and freedom from maintenance.

This unit incorporates the same features of high efficiency, economy, safety, quietness, and smoothness associated with over 12,000 Spicer positive generator drives in use on railway Pullman coaches, diners, and other rolling stock throughout America.



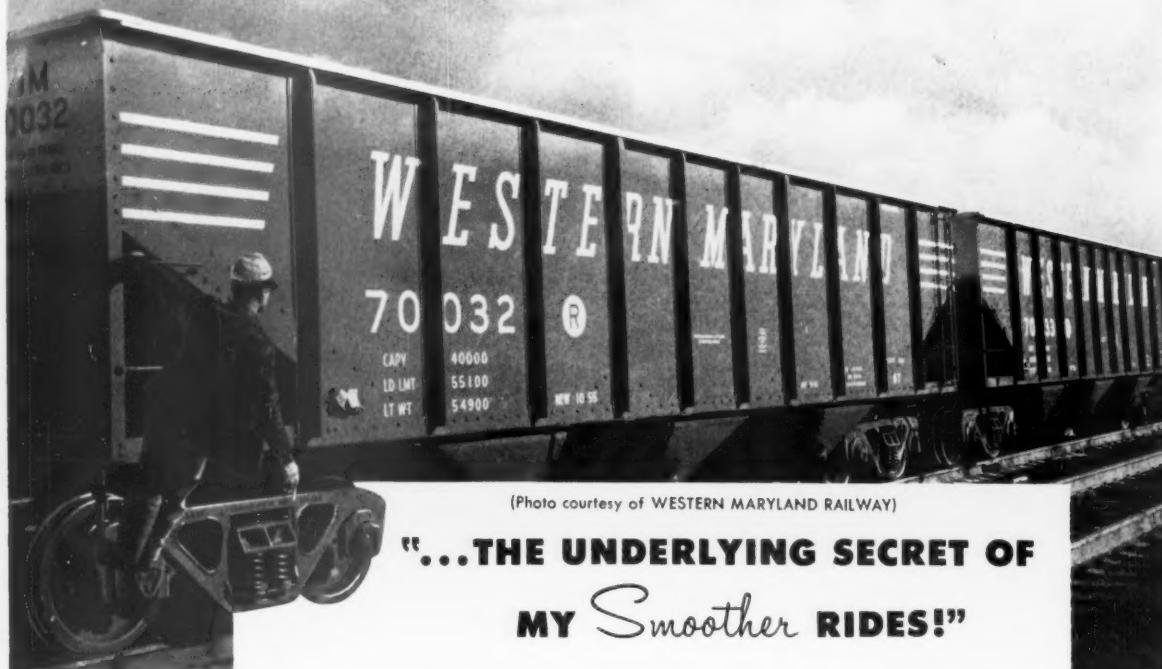
The Spicer Model 8 Drive as  
used in Budd Rail Diesel Cars.



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**SPICER PRODUCTS:** Transmissions • Universal Joints • Propeller Shafts • Axles • Torque  
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## IF A HOPPER CAR COULD TALK...



(Photo courtesy of WESTERN MARYLAND RAILWAY)

"...THE UNDERLYING SECRET OF  
MY Smoother RIDES!"

"I'm a Western Maryland triple-hopper car. I carry coal to light the nation's homes and turn its wheels of industry. I'm new in this business because the company just recently put me 'on the line.'

"But, already, I'm proud. Besides giving me the beauty of modern design, Western Maryland planned my future by providing me with the *best* of equipment. In exchange, I'll give them years of excellent, low-cost service.

"I especially like to rest and ride on my sturdy dependable Barber Stabilized Trucks. Barber introduced them . . . 25 years of research and development have

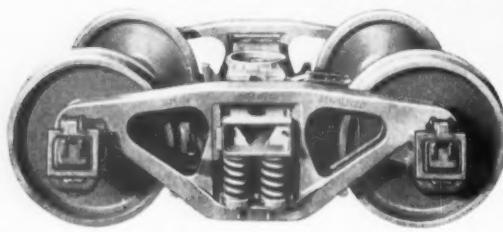
kept them modern.

"Because I like to keep on the go, I was . . . happy to learn that Barber Stabilized Trucks are the easiest and quickest of any truck to dismantle, service and assemble with no special tools.

"Very important to me is the fact that Barber Stabilized Trucks protect my body, underframe and costly cast-steel parts by their ever-ready . . . yet simple and effective . . . system of suspension which allows them to absorb dangerous, destructive road shocks.

"I like to *rest and ride* on my Barber Stabilized Trucks!"

SPECIFY SMOOTHER RIDING



# BARBER

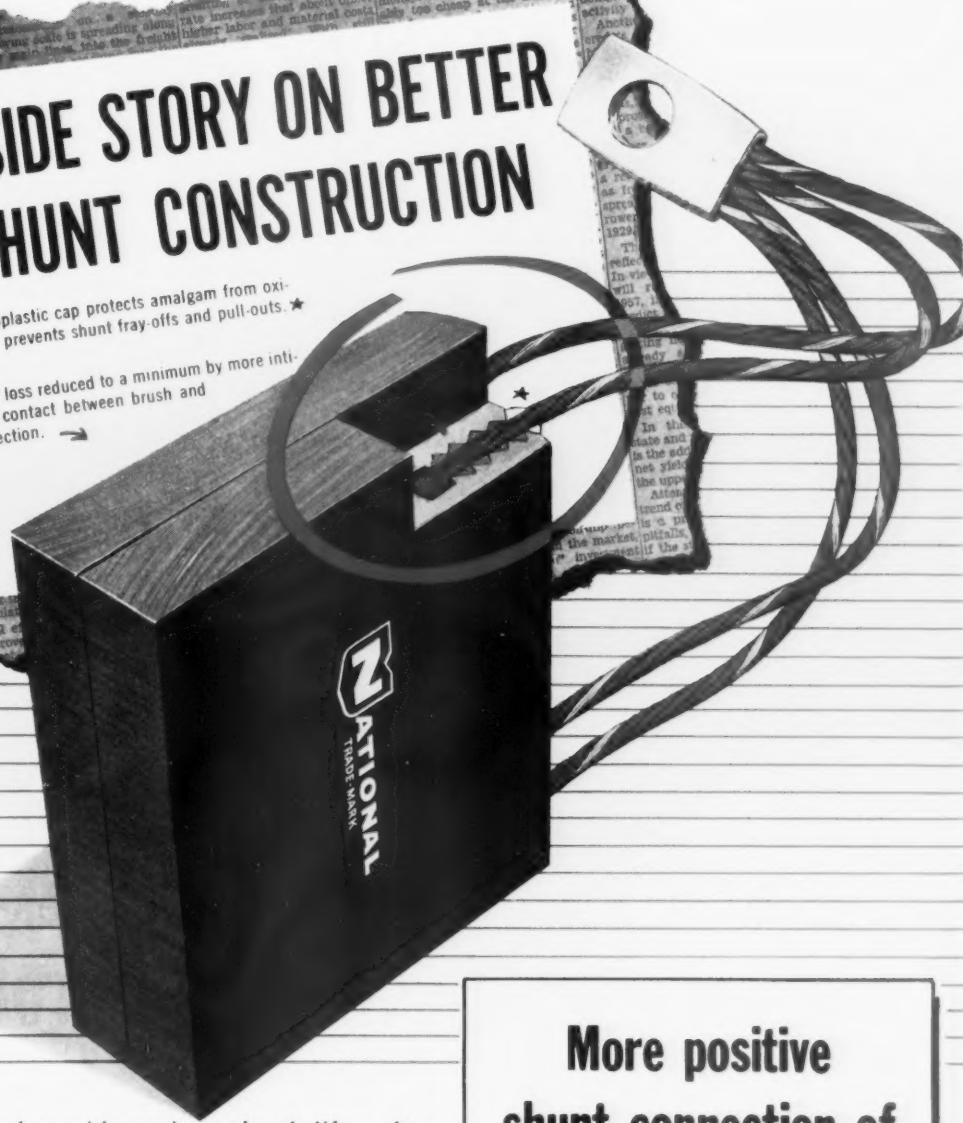
STABILIZED TRUCKS

Standard Car Truck Company, 332 S. Michigan Ave., Chicago 4, Illinois. *In Canada: Consolidated Equipment Co., Ltd., Montreal 2.*

# INSIDE STORY ON BETTER SHUNT CONSTRUCTION

Thermoplastic cap protects amalgam from oxidation, prevents shunt fray-offs and pull-outs. \*

Power loss reduced to a minimum by more intimate contact between brush and connection. →



Minimum power loss with maximum brush life . . . less down time for maintenance . . . top performance under widely varying road conditions. You can count on all these advantages with "National" brushes because their tamped, plastic-protected shunt connection offers the lowest possible resistance to current flow.

All grades and construction features of "National" brushes are proved in road operation before being offered for regular service. You can always depend on them for superior commutation ability, excellent commutator condition with long life.



**NATIONAL BRUSHES** Best for all types of equipment... preferred for all types of service. Order through your equipment manufacturer.

More positive  
shunt connection of

**NATIONAL**  
TRADE MARK  
**BRUSHES**

gives greater  
operating economy

The term "National" and the Silver Colored Cable Strand are registered trade-marks of Union Carbide Corporation  
**NATIONAL CARBON COMPANY** • **Division of Union Carbide Corporation** • **30 East 42nd Street, New York 17, N. Y.**  
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. In Canada: Union Carbide Canada Limited, Toronto



## General Electric Locomotive Cables wherever overloads are a problem

Steep grades and heavy hauls often mean overloads on locomotive cables. In conditions such as these, insulation to withstand the resultant high copper temperatures without deteriorating is required. That's one of the outstanding advantages you get by rewiring with General Electric Versatol\* Geoprene\* locomotive cable.

Another is this cable's ability to stand up under other severe operating conditions. The tough, neoprene-base jacket will withstand flying pebbles,

abrasion, vibration, flexing, and attack from such corrosive agents as oils, steam, detergents, and other cleaning compounds.

You get immediate delivery service, too, because Versatol Geoprene is stocked in a variety of types for all applications (even extreme temperature) right in conveniently located warehouses. For more information, write Section W214-647, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

\*Registered Trade-mark General Electric Company.

*Progress Is Our Most Important Product*

**GENERAL**  **ELECTRIC** •

The cartridge bearing encircles the journal. The journal collar is machined off to permit assembly, and a separate collar is secured with cap screws. The cartridge unit is cast of high strength bronze and plated with a heavy-duty lead-tin alloy. It contains its own lubricating system and is effectively sealed by a lubricated felt ring riding on the conventional dust guard diameter. The Redipak twin lubricating pad is installed when the cartridge is applied to the axle. Oil is contained in the cartridge, not in the box. The usual journal box lid is not needed.



## Here is the New National Cartridge Bearing!

*Road service is now demonstrating that this economical sleeve bearing stands up under today's toughest freight car service*

This revolutionary new concept in journal bearing design—now being road tested—may well become the freight car bearing of the future. The National Cartridge Bearing is a complete, sealed bearing and lubricating system. It neatly fits a standard journal box after the dust guard well has been cut out. The bearing encircles the journal—so it cannot lift or shift—and contains its own oil reservoir, Redipak® twin lubricating pad, cover and seal.

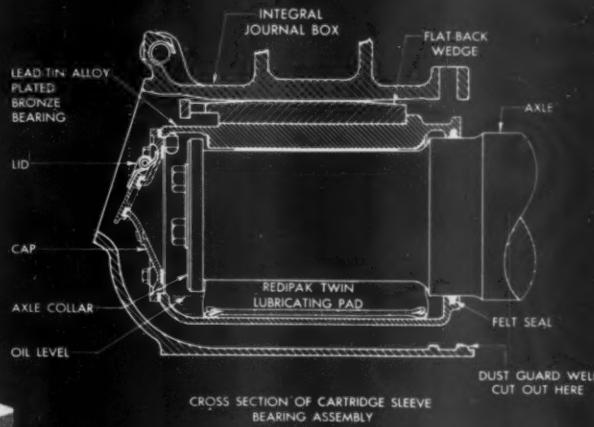
Here are a few of the principal advantages offered by the

cartridge bearing unit: It stands up to greater impact and braking forces than do roller bearings. It requires very little maintenance—just an infrequent check of oil level and occasional replenishment of oil supply. It assures longer life—no measurable wear on either bearings or journals in over a year's accelerated road service. It minimizes the chances of hot boxes. And finally, it provides savings in initial costs when compared to roller bearings . . . savings in installation and replacement costs . . . and savings in removal costs when a wheel change is needed.

Present service tests on three roads have proven excellent and are validating our laboratory findings. One thousand car sets have been approved by AAR for test in interchange service.



*Wheel, axle and cartridge sets are made up in advance for assembly into trucks. No bearing work is done on the rip track.*



AMERICAN  
**Brake Shoe**  
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RAILROAD PRODUCTS DIVISION  
530 Fifth Avenue • New York 36, N. Y.

# How Armco Freight Car Flooring Helps Boost Profits

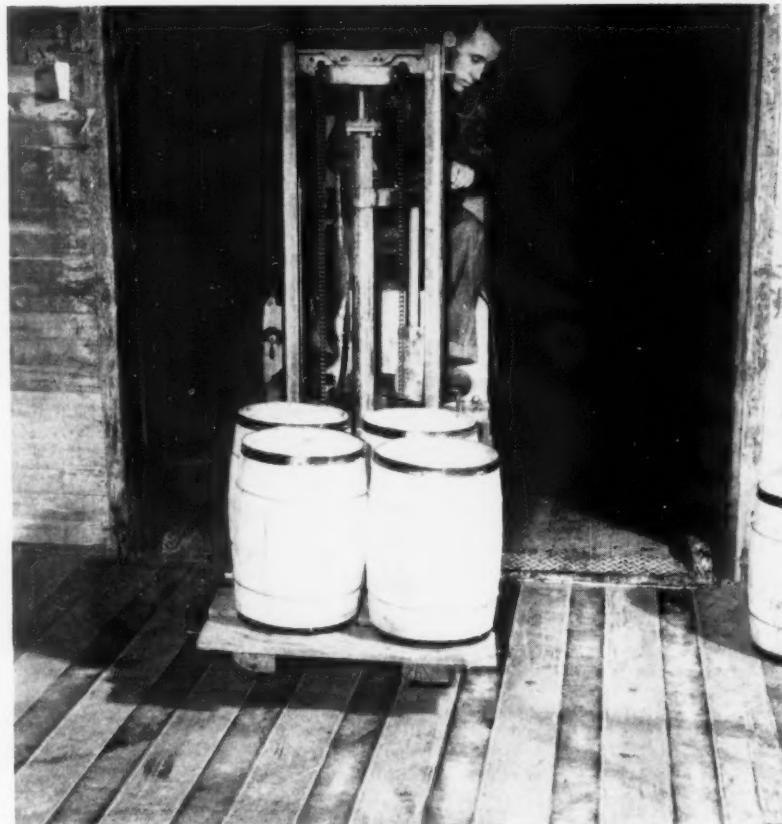
Nailable Armco Freight Car Flooring builds this four-way foundation for higher profits from gondolas, box or flat cars:

1. **They last longer because they're stronger**—Hat-shaped steel ribs and wood planks, laid alternately, bear up under heavy lading. At the same time, they reinforce the car underframe.
2. **Less down-time**—Strength to resist damage helps Armco floors keep cars out of the repair shops.
3. **Costly claims reduced**—since Armco Freight Car Floors stay in good condition, they help cut down on damage to lading.
4. **Each car produces more revenue**—Armco floors support bulk *and* unit lading. You get more work from fewer cars because it is not necessary to choose cars by floor type.

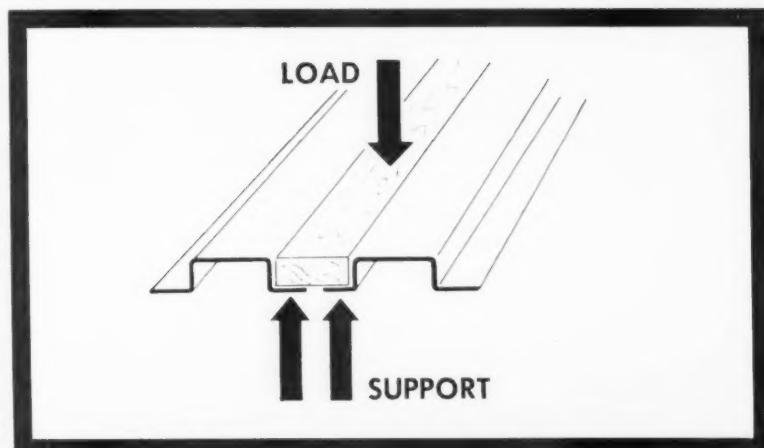
## Tailored Floors

After studying blueprints of your car frames, Armco engineers "tailor" standard Armco Flooring to suit your needs. For example, ribs will come coped to clear rivet heads if your car construction requires. Detailed drawings reach you before the flooring arrives—help speed assembly.

Further information on Armco Freight Car Flooring is readily available. Just contact the Armco Sales Office near you, or write us at the address below.



Wheel loads of five tons from lift trucks are common, but easily supported by Armco Freight Car Floors. The reason: Two steel ribs support each wood plank.



## ARMCO STEEL CORPORATION

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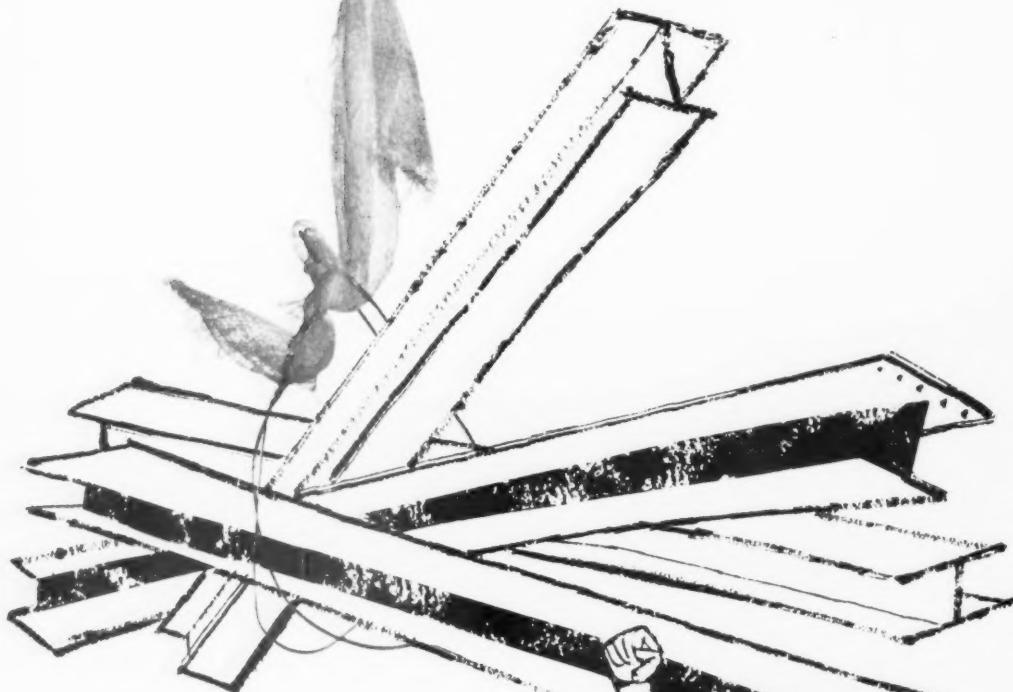
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- ABRASIVE DISCS
- VALVE FACE  
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"...and  
don't come back  
without those Roebling  
Slings!"



You sure can't blame the foreman for losing his temper. After all, anybody who has to lift almost anything *should* know that Roebling makes a full line of wire rope slings and assemblies for almost any lifting job.

For example (and there are lots of examples), take Roebling All-Purpose slings. As you'd gather from the name, they are for general lifting jobs. They are *all steel* from end to end, compact, extremely versatile and dependable. All-Purpose slings are made from Roebling "Blue Center" wire rope with independent wire rope core. Two of their fine features are their unique rolled loop and tapered sleeve, which develop full catalog strength.

While we're on the subject of catalogs, we do hope you have a copy of Roebling's quick and accurate sling-selecting catalog. It goes by the name of "Roebling Wire Rope Slings and Assemblies," and the number A-931. We're pretty sure it will answer a lot of your lifting problems and it's yours for the asking.

On real tough jobs, of course, no catalog is a substitute for the experienced advice or suggestions of *your* Roebling salesman or distributor. To get this benefit, contact them or use any means of communication to: Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

**ROEBLING**   
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LOCK NUT**

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holding features of  
ordinary lock nuts.

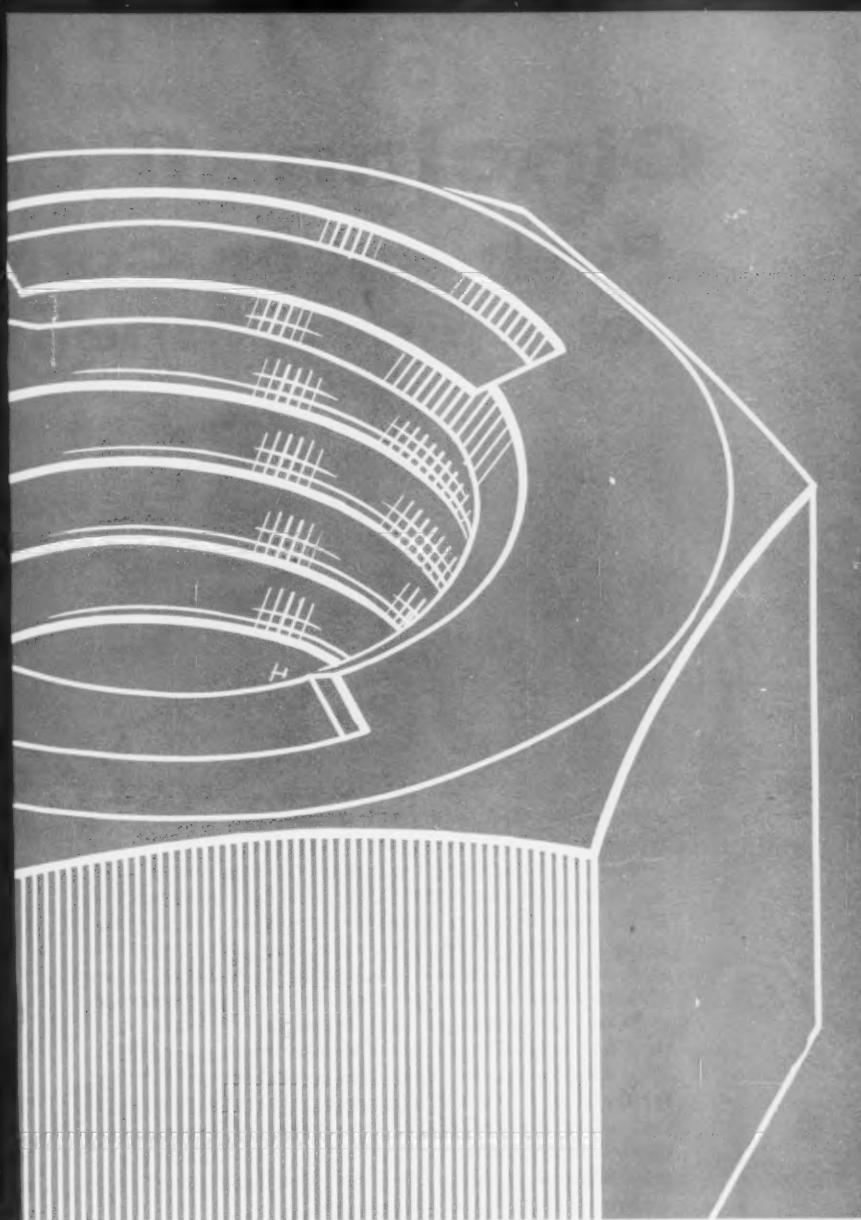
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nut you can de-  
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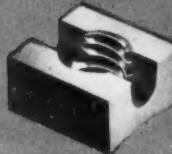
Because of its low cost for high efficiency, the M-F Uni-Torque is the ideal lock nut for air brake equipment, angle-cock holders and other appliances subject to high vibration.



**M-F LOCK NUT**

No. 1

Used with a standard  
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Spins on, locks itself  
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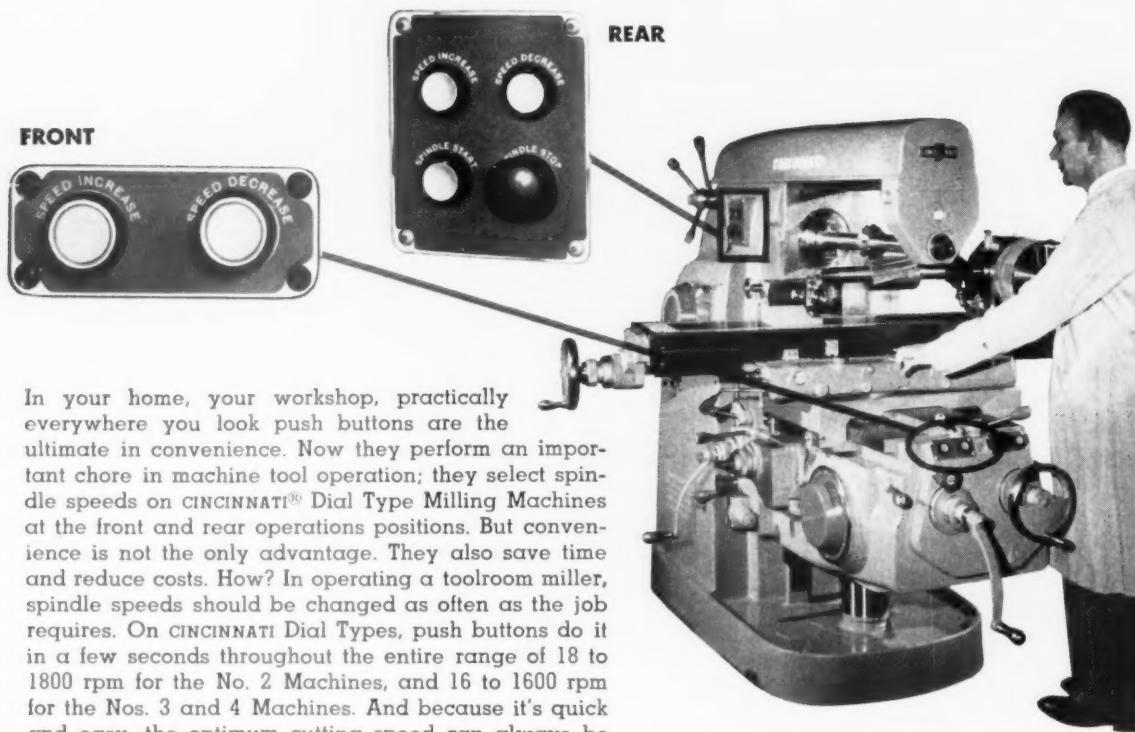
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LOCK NUTS • WATERTIGHT BOLTS • SPECIAL BOLTS • FLOOR CLIPS • STANDARD NUTS • LADING STRAP ANCHORS •



# Cincinnati Gives You Push Button Convenience for Spindle Speed Selection



In your home, your workshop, practically everywhere you look push buttons are the ultimate in convenience. Now they perform an important chore in machine tool operation; they select spindle speeds on CINCINNATI® Dial Type Milling Machines at the front and rear operations positions. But convenience is not the only advantage. They also save time and reduce costs. How? In operating a toolroom miller, spindle speeds should be changed as often as the job requires. On CINCINNATI Dial Types, push buttons do it in a few seconds throughout the entire range of 18 to 1800 rpm for the No. 2 Machines, and 16 to 1600 rpm for the Nos. 3 and 4 Machines. And because it's quick and easy, the optimum cutting speed can always be used; cutting action is more efficient and there's less possibility of wrecking the cutter. There are many other CINCINNATI Dial Type advantages:

Power dual selection of feeds,  $\frac{3}{8}$ " to 90" per min.  
Independent, directional controls, with name knobs  
Automatic backlash eliminator  
Dynapoise chatter-damping overarm  
Automatic table feed cycles available for plain and vertical machines

Want more information? Look in Sweet's Machine Tool File for brief specifications; complete data in catalog No. M-1915.

THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO

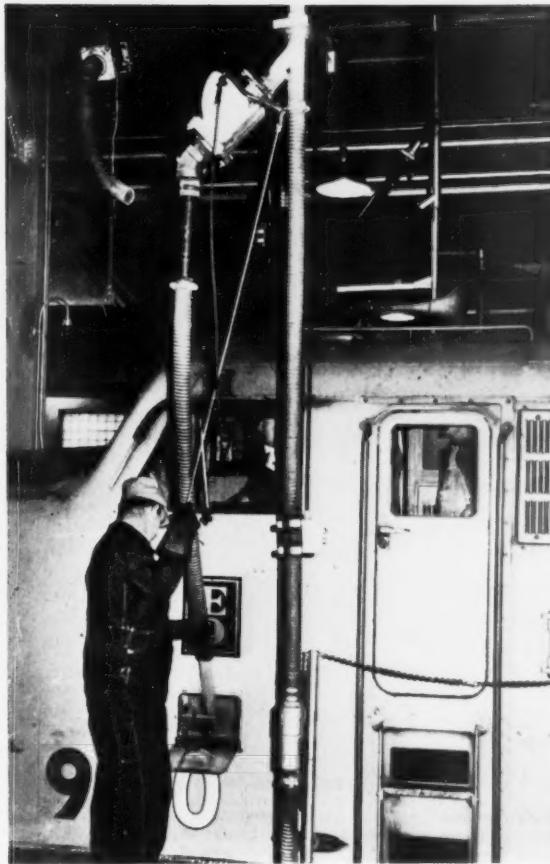
CINCINNATI NO. 2 UNIVERSAL DIAL  
TYPE MILLING MACHINE easily takes a  
heavy helical milling cut.

DIAL TYPE LINE	table traverse	main drive	automatic table cycles available
No. 2   Plain Universal Vertical	28"	10 hp	yes no yes
No. 3   Plain Universal Vertical	34"	15 hp	yes no yes
No. 4   Plain Universal Vertical	42"	20 hp	yes no yes



# CINCINNATI

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES  
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS



Fueling through the leak-proof and spill-proof nozzles is done from the lower shop level. Short sections of the elevated work platform overhead are hinged and fold back so fueling inlets higher on units can be reached.

Sanding of UP's road, road-switcher and switching locomotive can be done inside the shop where 28 outlets have hoses and controls which can reach sand boxes whether on the top, sides or ends of the units.

## UP Fuels and Sands Diesels Indoors

*New Council Bluffs "Lubritorium" aims at "one-stop" servicing for road locomotives.*

At Council Bluffs, Iowa, the Union Pacific has built a new facility in which all diesel-servicing operations—including fueling and sanding—are done inside. The UP labels this new shop a "lubritorium." It houses all the operations involved in servicing diesel locomotives, leaving nothing to be done out-of-doors except washing. Light repairs are made there, too, but heavy repairs, if required, are made in another shop at Omaha.

The fire-resistant structure, built at a cost of \$2 million, is large enough to handle 24 units at one time. It is divided into two distinct sections, each having three

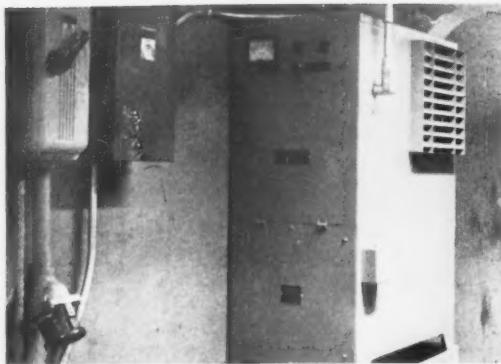
through tracks. Four diesels can be handled simultaneously on each track. The facility has the conventional arrangement of depressed and elevated working platforms, and track pits. The two sections are separated by a concrete platform where there is a small machine shop, tool room and office.

The building has a structural-steel frame, concrete-block exterior walls, and concrete floors. The elevated working platforms between tracks and along the side walls are formed of open-mesh steel grating.

Locomotives enter the shop through large rolling steel doors at both ends of the building. Once a

diesel is run into this shop and stopped, it is possible that it may not be moved again until it is ready to couple onto a train destined for the Coast.

In addition to fueling, sanding and trip inspection, each unit passing through the shop is given the periodical inspection for which it may be due. As it rolls to a stop, samples of lubricating oil and cooling water are taken. A crew is assigned to conduct a thorough inspection, and repair defects found. While the initial inspection is given, tests are run on the oil and water samples. Each sample of oil is checked for dilution and viscosity. A blotter test is used to detect contamination and a hot plate check is made for possible water content. A borate-type inhibitor is used in UP engine cooling water. The concentration is checked and the inhibitor



Charge for diesel batteries without removing them from the units is done through the GE rectifiers in the shop.

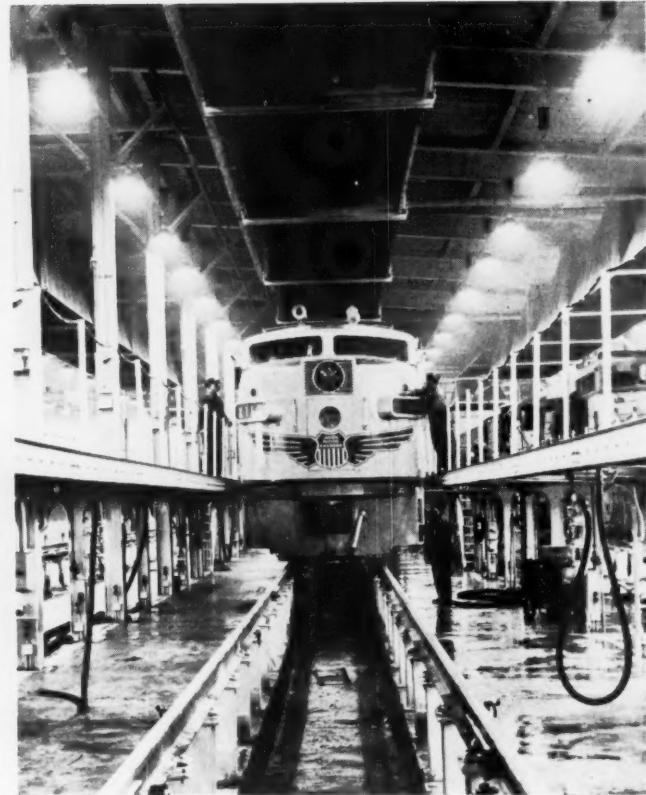


replenished if necessary.

While the tests and inspections are being conducted, the air intake filters are removed when inspection shows the air flow restricted by accumulation of dirt. The dirty filters are given a thorough cleaning and treated with a new coating of oil in the filter cleaning and oiling machine.

A vapor degreasing machine, newly installed, with a chlorinated solvent type cleaner, is used for cleaning both diesel and gas-turbine fuel oil strainers. The cleaning fluid is heated electrically to 230 deg F, becoming a vapor which passes upward through the strainers resting on a platform above the liquid. As the vapor passes through the strainers, it carries with it the old oil and frees the foreign matter so it can be blown off with compressed air. Cooling coils above the strainers condense the vapors in the cleaning chamber and turn it back to liquid form.

An extra series of inspections has



Each overhead hood has its own motor and exhaust fan. Elevated work platforms are open-mesh steel grating. All service lines except those for sand are carried under the elevated platforms.

Color scheme was established and all pipe lines in the shop are color coded to indicate the materials which they carry.

been added to those required by the ICC and the normal railroad servicing routine. In the case of passenger units, these periodical inspections are given every five days and to units in freight service every fifteen days.

An instruction book is available to the shop forces where the procedures to be followed are set out step by step. Code numbers on the inspection forms direct the workmen to the page that pertains to his particular inspection. "With this book," an official says, "any of our workmen can make the required examinations even though he is not familiar with the procedure for that particular inspection. All he has to do is follow the schedule set out in the book."

Daily work within the shop includes engine repairs such as replacement of pistons and liners, and there are often calls for major repair jobs. According to the shop foreman, equipment is available to do anything except pull the engine or main generator.

The fuel service lines are located immediately below the elevated platforms with outlets spaced at intervals so that any of the various types of diesel units may be fueled without moving them. All fueling nozzles are of the leak-proof, spill-proof type for reducing the fire hazard.

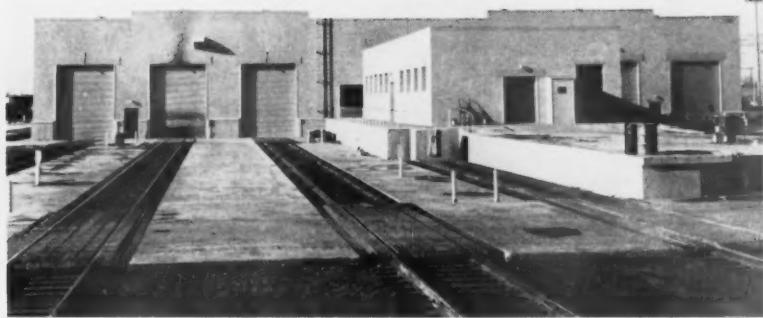
All other service lines, with the exception of those for sand, are also placed beneath the elevated platforms. These include zeolite-treated water for the steam generators, borate-treated water for the cooling systems, and lubricating oils. Sufficient outlets are provided to permit one-stop servicing. Hinged steel-mesh panels, provided where necessary along the edges of the platforms, swing upward to allow access to the water, fuel and oil inlets on the sides of the locomotive units, which otherwise would be inaccessible because of the platforms.

Service pipe lines had to be provided within the building for carrying these 12 different materials: Sand, S. A. E. 30 lube oil, S. A. E.



Oil testing area is at one end of the center platform which also has the machine shop, tool room and shop office.

40 lube oil, drained lube oil, raw water, radiator water, steam, condensate, boiler water, drained water, air and fuel oil. A color paint scheme assures proper identification of the lines. The color scheme is stenciled on the walls at several locations for quick reference.

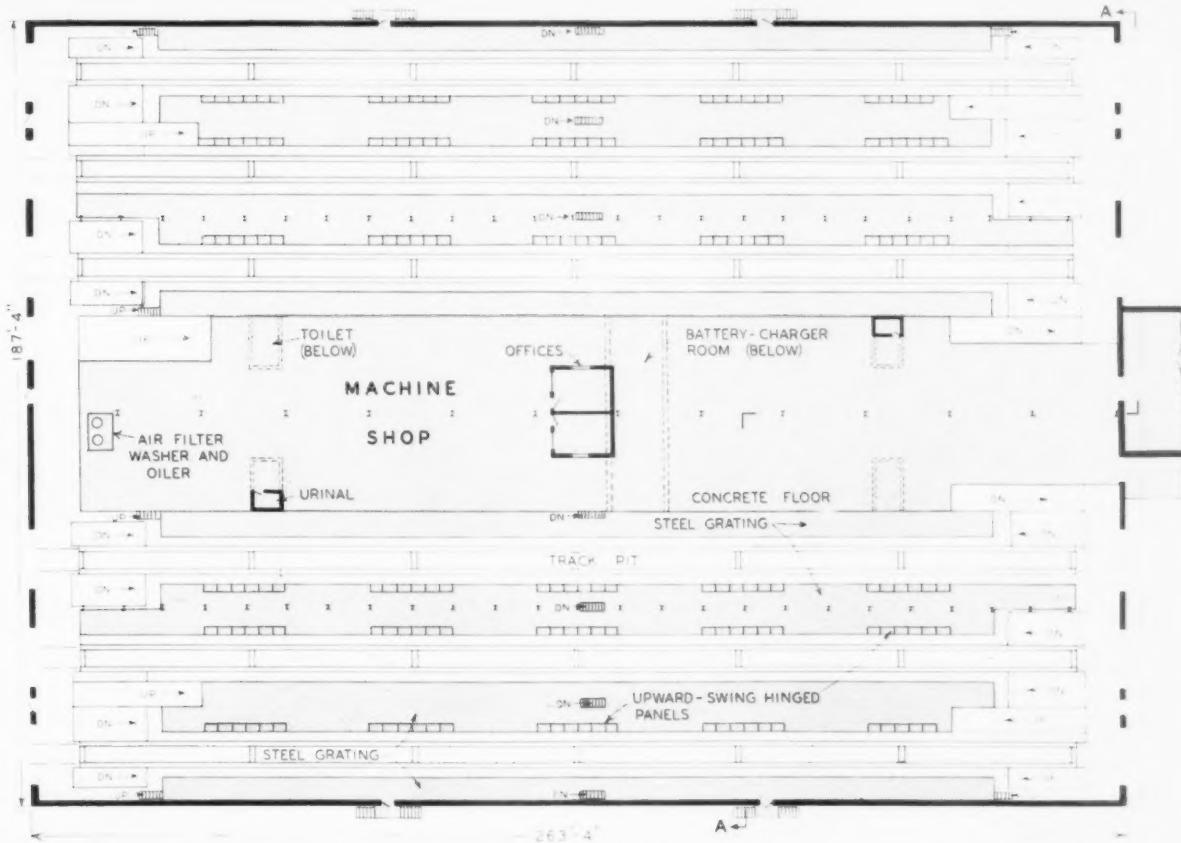


Stores building is at the end of the shop and has facilities for railroad and truck deliveries. Shop does not have the usual outside facilities for the fueling and sanding of the diesel locomotives.

The provision of interior sanding facilities was one of the most difficult problems facing the designers of the building. A system was adopted that uses air pressure to force the sand through pipe lines to the service outlets. This installation includes two 10-ton capacity over-

head storage tanks, one placed over the middle track in each section. There are 28 sanding outlets arranged so that sand may be delivered to the side, front or top boxes of locomotive units on any of the six tracks.

(Continued on page 45)



Minimum servicing time was the aim of this shop arrangement which has brought fueling and sanding operations inside. The shop holds four units on each track and can accommodate a total of 24 at one time. Ramps at the ends connect the three levels. Shaded areas designate those sections which are at carbody-floor height.

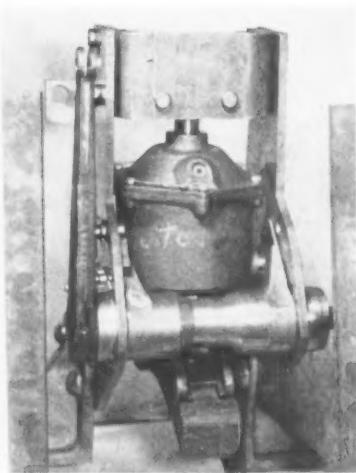


Westinghouse B-7 package brake unit is used on the New York Central "Xplorer" and New Haven "Dan'l Webster". Both of these trains are Pullman-Standard's "Train-X" design. The single shoe, mounted on the axle housing, acts vertically downward on the wheel tread. A single 7-in. cylinder moves levers designed for a 2.25 to 1 force ratio. Screw-type slack adjustment is made between the hollow rod and push rod.

Budd disc brake package, used on "Pioneer III" coach (*Railway Locomotive and Cars*, March, 1957, p. 52), is double acting. The entire brake unit is dismounted by removing two bolts. The single, cast-iron disc is "pinched" by composition linings on the two shoes. The outboard-mounted disc on each wheel is attached with bolts through the wheel web. Air cylinder, tongs, and tong supports are attached to the side frame.

## For Lightweight Cars....Package Brake Units

*Lightweights have created the need for different braking systems. Compact package brake units are used with the recently-developed control equipments.*



Brake package for ACF-built Talgo-type cars of New Haven's "John Quincy Adams" and for a Boston & Maine train yet to be delivered has direct connection between brake cylinder and brake head. Westinghouse designed this arrangement.

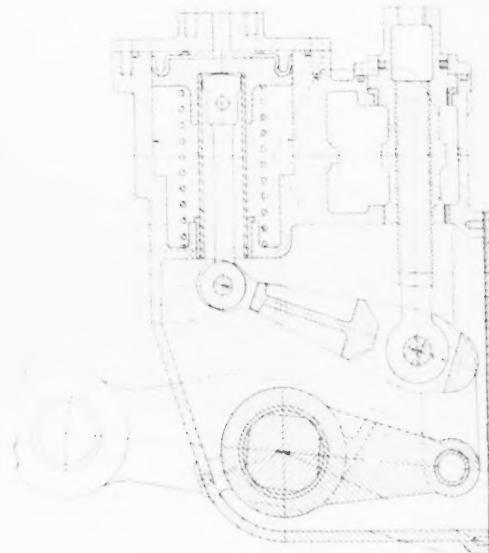
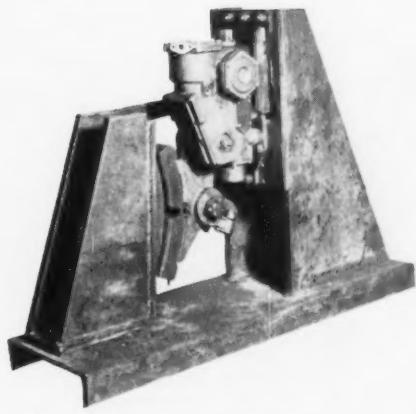
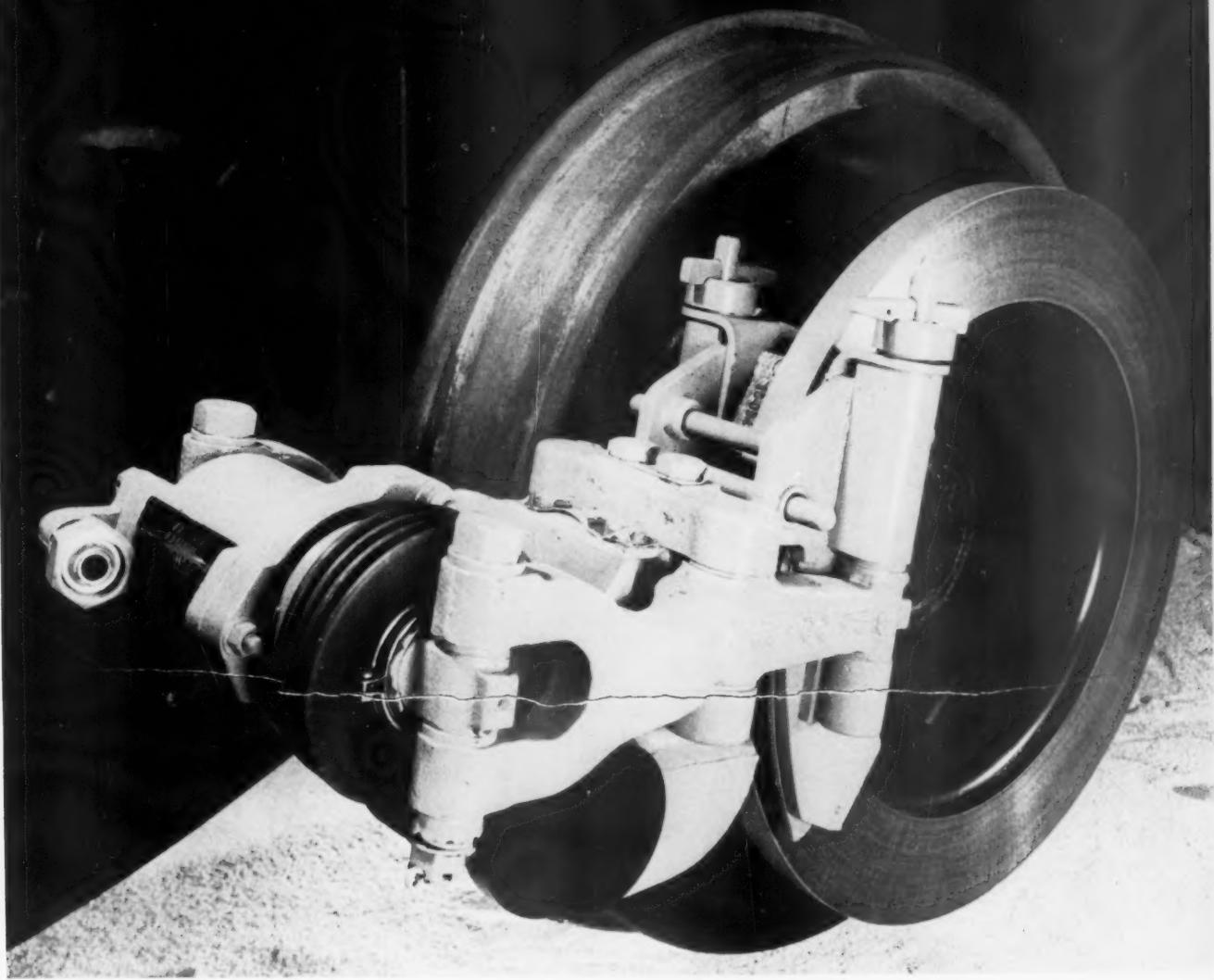
Serious consideration of lightweight trains began more than twenty years ago. Early efforts produced the first Burlington and the Union Pacific "streamliners." Through the years, two objectives have been lower operating costs and faster operating schedules.

Although light weight, high strength materials led the way, recent passenger equipment designs have utilized air-ride suspension, single-axle support, and newly-designed locomotive and car brake equipment. The Westinghouse "26" and New York "LWE" equipments were designed to reduce weight while incorporating all the accepted safety features (*Railway Locomotives and Cars*, October 1956, p. 67 and December 1956, p. 44). Accessibility of the various components in restricted spaces is a result of their compactness. The

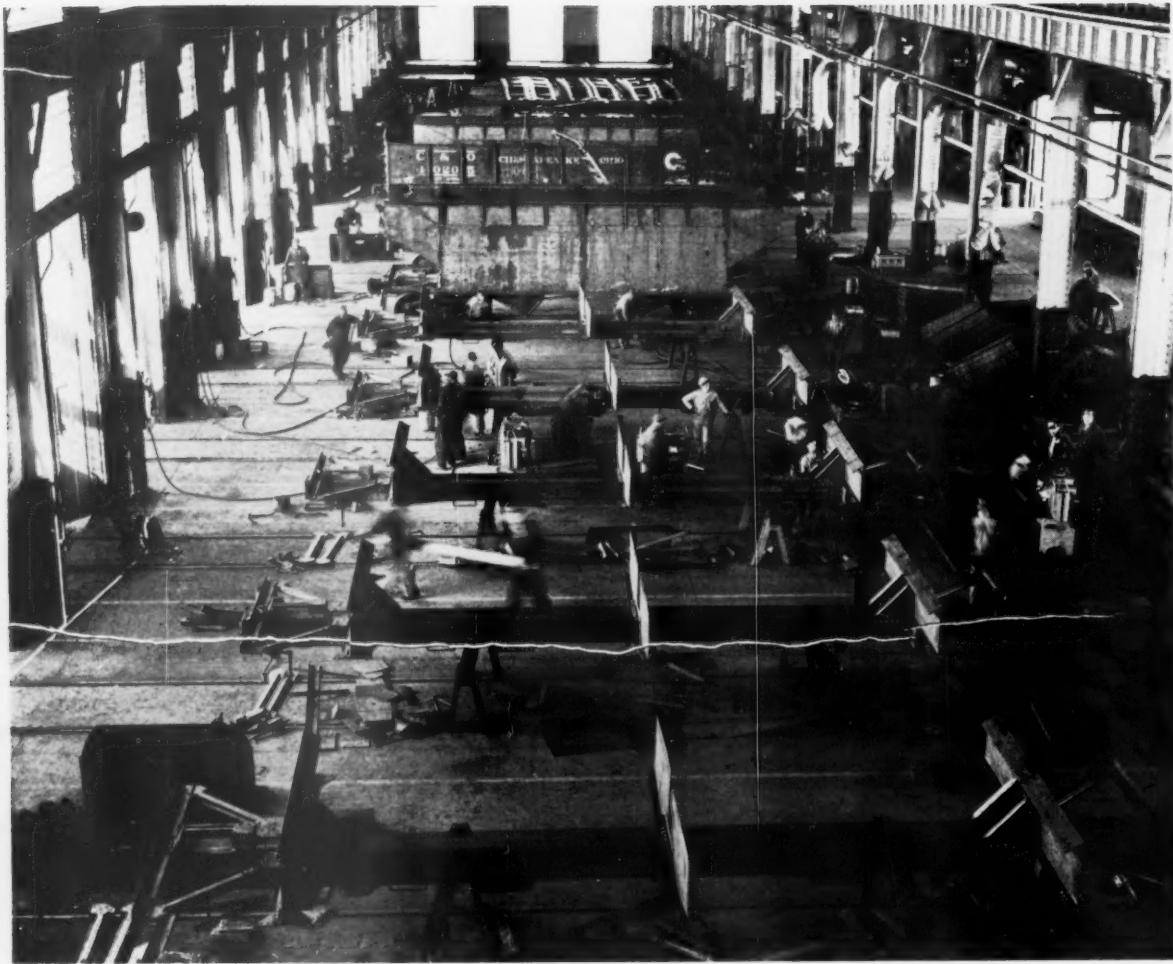
introduction of composition brake shoes has permitted the use of smaller cylinders and reservoirs.

Along with the control equipment, compact package brake units have come into their own and are in service on a number of light-weight trains. These units include the brake cylinder, a means for adjusting slack, and the required foundation parts. Higher operating efficiency over conventional arrangements of brake rigging has been reported. For one thing, friction loss is reduced because fewer levers and pins are required.

Package brake units mean just that. Individual brake mechanisms function with each brake shoe. This insures a positive and uniform release clearance between the shoes and the wheels. Because the units are removable and replaceable, servicing can be simplified.



Package unit designed by Westinghouse for Boston MTA subway cars has a 4½-in. brake cylinder, an automatic pneumatic slack adjuster, and sufficient leverage for a 5 to 1 force multiplication. A single housing completely encloses the assembly (right).



Underframe shop builds trucks, hopper and gondola underframes; also it installs floors and sides on hoppers.

**B&O Makes Its Decision . . .**

## 'Patching' Repairs Don't Do The Job

Heavy repairs, complete rebuilding, or replacement with new cars are the most economical methods for putting a freight car fleet in condition to operate economically and to provide shippers with cars to handle their traffic, according to the Baltimore & Ohio. Its freight car designs, freight car repair facilities and repair forces are being realigned in accord with these concepts. Already the B&O's bad order ratio is reflecting the success of this program. The 25 new freight cars turned out each working day by the

Baltimore & Ohio's DuBois, Pa., car shop are part of an important phase of this long-range plan to make the B&O car fleet better able to handle the road's present and future traffic. The B&O's long-range program will put cars in such condition that they will not require shopping for 15 to 20 years. The program is planned to reduce the bad order ratio to 3 per cent or less by 1960.

Premises in this plan are the following:

(1) Older cars will be replaced with

new purchased cars, or they will be rebuilt with new material and parts reusing only those components which are relatively modern.

(2) Each type of car will be standardized into relatively few classes. This will reduce material stocks and will permit the streamlining of heavy and reconditioning repair operations.

(3) The railroad's facilities can turn out freight cars which measure up to the highest standards; the latest car construction techniques can be utilized while making the maximum

use of B&O's skilled manpower.

(4) Saving realized from this program can maintain a thorough and continuing repair program which will increase the number of serviceable cars.

On March 11, 1955, the B&O had 15,160 bad-order cars of 16.8 per cent of its ownership. On January 11, 1957, this had been cut to 3,282 bad-order cars—3.5 per cent. In less than two years the railroad had increased its supply of serviceable cars by 11,816.

#### "Heart" of Operation

The DuBois assembly lines for freight car building are only one phase of the B&O's new freight car program. However, the B&O classifies DuBois car shop as the "heart" of the overall scheme which aims to increase the road's supply of serviceable equipment through systematic car building and rebuilding. This process is intended to make necessary only the lightest of repairs on these rebuilt cars during the coming years. DuBois shop was converted from an abandoned steam locomotive back shop and was described in *Railway Locomotives and Cars, June, 1955, P 62.*

The DuBois shop was established to do production-line repair work prior to the adoption of the new car program. Since October, 1956, it has been engaged solely in the rebuilding program. By using all of the facilities to near maximum, output has been shoved up to 25 essentially new cars each working day.

The output of 25 cars each day from the present plant is dependent upon the purchase of complete sub-assemblies from car builders. The road is concentrating almost all of its efforts on hoppers, box cars and gondolas which collectively add up to more than 90 per cent of the B&O ownership. In the program, cars are cut down completely and only such parts as side frames, bolsters, brake cylinders, reservoirs, retaining valves, wheels and axles are reused. Even these are closely inspected, and only the newest ones and the latest models are returned to service.

The assembly operations take place in four buildings—three originally used for locomotive repairs, (Continued on page 43)



New from ground up is B&O theory on freight car rebuilding. First step is systematic cut-down. Only few parts are salvaged and reused in program.

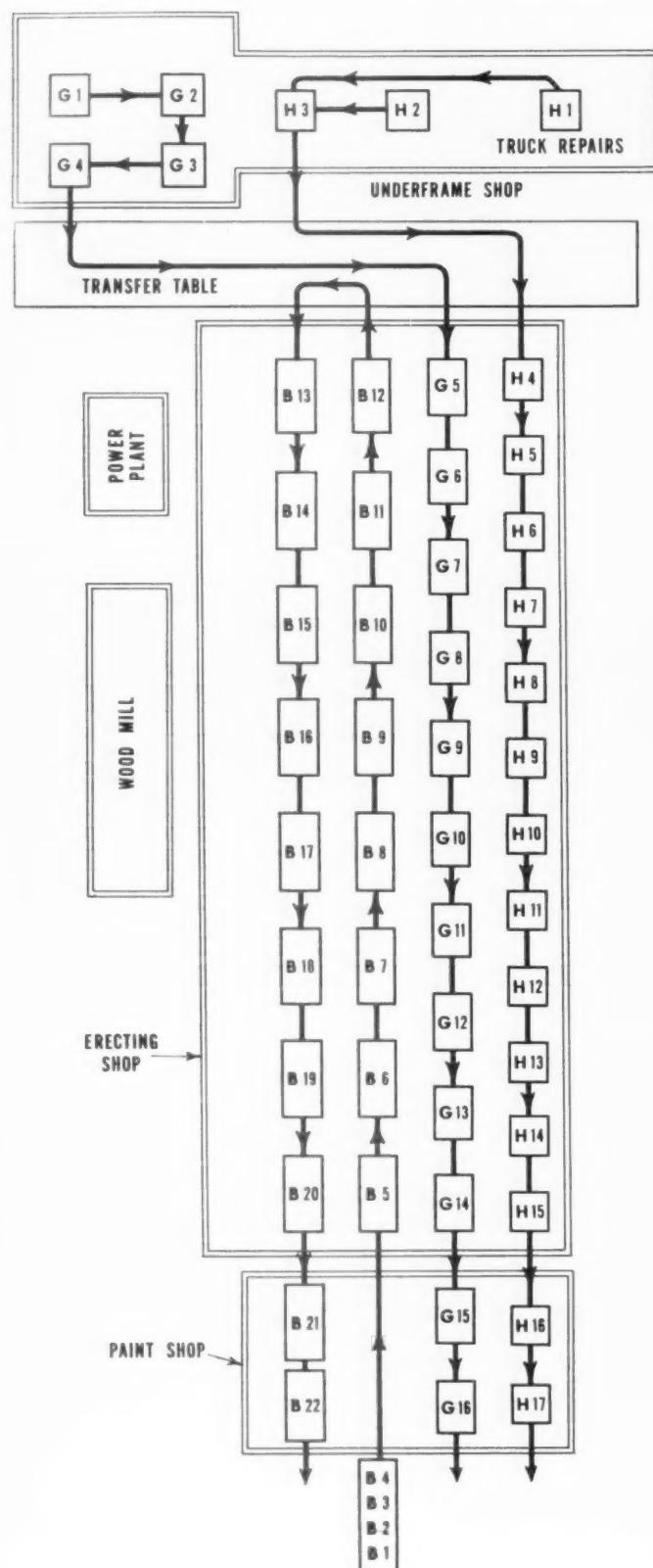


Truck rebuilding is systematic. Shop has two tread lathes and one journal lathe. Trammals cover entire truck repair area to simplify procedures.

Transfer table moves hopper to erecting shop where it will start down 12-station production line. Box car production line is reversed on table.



These Lines Produce 25 Cars Daily . . .



### Box Car Assembly

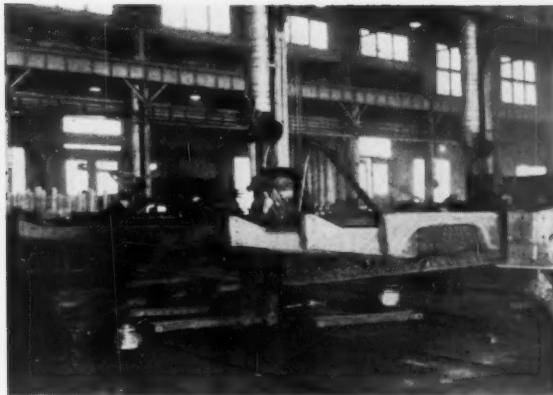
- B1 Assemble roof panels and caps, and rivet.
- B2 Assemble trucks complete with levers, rods, seals and lubricators.
- B3 Apply underframe to trucks and install couplers.
- B4 Apply sides and ends to underframe with fitting-up bolts.
- B5 Apply draft gears, lever brackets, drive bottom of car.
- B6 Apply foundation brake.
- B7 Apply rods and levers.
- B8 Rivet sides and ends to underframe.
- B9 Apply nailable steel flooring.
- B10 Apply wood flooring.
- B11 Drill floor and apply floor clips.
- B12 Weld studs for furring strips and posts.
- B13 Rivet top of car.
- B14 Apply and fit up roof assembled at B1.
- B15 Rivet roof.
- B16 Apply posts and furring strips.
- B17 Apply side lining and lading anchors. Nail lining.
- B18 Apply end lining. Nail lining.
- B19 Single car tests, cement steel flooring, nail lining.
- B20 Inspect and final work.
- B21 Spray Painting.
- B22 Stencilling.

### Gondola Assembly

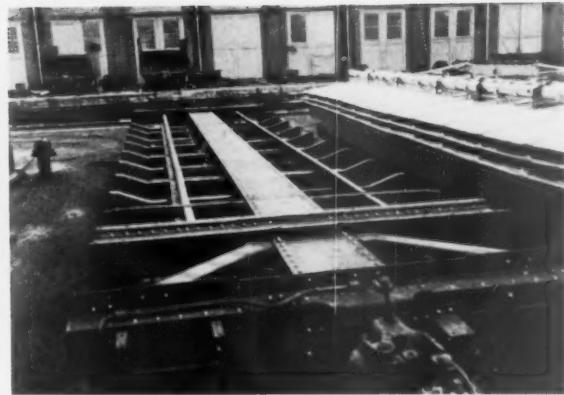
- G1 Assemble center sill.
- G2 Assemble underframe including bolsters, diaphragms, end sills, couplers, draft gears. Rivet.
- G3 Assemble trucks complete with levers, rods, seals and lubricators.
- G4 Apply underframe to trucks.
- G5 Apply sides to underframe with fitting-up bolts.
- G6 Apply steel portion of composite floor.
- G7 Fit and ream corners.
- G8 Apply ends and top end angles.
- G9 Ream ends, floor and sides.
- G10 Rivet.
- G11 Apply wood floor, hand brake and safety appliances.
- G12 Drill wood floor.
- G13 Apply floor clips and lading strap anchors. Make brake test.
- G14 Inspect and final work.
- G15 Spray painting.
- G16 Stencilling.

### Hopper Car Assembly

- H1 Assemble trucks, complete with levers, rods, seals and lubricators.
- H2 Assemble underframe including couplers, draft gears, bolsters, cross ridges, center plates, end sills and diagonal braces.
- H3 Place underframe on trucks and apply hoppers, longitudinal hoods, floors and sides with fitting-up bolts.
- H4 Apply ends and side braces with fitting-up bolts.
- H5 Tack weld sub-assemblies so fitting-up bolts can be removed. Ream.
- H6 Ream.
- H7 Rivet center sill area of car.
- H8 Rivet top, sides and floor (A end). Rivet sides.
- H9 Rivet top, sides and floor (B end). Rivet sides.
- H10 Complete inside riveting.
- H11 Apply AB valve, cylinder and reservoir.
- H12 Apply levers, rods and service pipe.
- H13 Apply train line, complete seal welding and the hand brake application.
- H14 Hang doors, complete brakes, make brake test.
- H15 Final inspection and work.
- H16 Spray painting.
- H17 Stencilling.



Underframe assembly for gondolas has until recently been done at DuBois. This was three-step operation which used fabricated parts.



Latest cars use purchased underframes. Adjacent track has assembled box car roofs ready to be moved into the erecting shop.



Composite flooring in B&O gondolas is composed of alternate sections of wood decking and steel plates formed into shallow channels.



Finished gondolas have tie downs on side angles. Box cars have special steel flooring through doorway area and wood in car ends.

*(Continued from page 41)*

and the fourth an open-sided paint shop which was built as part of the conversion. In addition, there are stores facilities, a wood mill, and an outdoor area where cars are cut down. Actually the entire operation involves a number of B&O shops. Air brake portions are processed through the system brake shop at Cumberland, Md., new wheels and axles come ready for application from the wheel shop at Glenwood (Pittsburgh, Pa.), truck side frames are annealed at Keyser, W. Va., and fabricated car parts come from B&O's bolt and forge shop at Cumberland. In addition, this high-output operation involves the plants of the major car builders. These builders are supplying or have supplied

*(Continued on page 44)*



Typical of work simplification at DuBois was development of dolly which handles and locates hopper doors so the hinge pins can be slipped into place easily. Hopper doors complete with hardware are assembled prior to application as are most parts of all the cars.

## B&O Tools For High Output . . .



Stud welding has speeded application of posts and nailing strips in the box cars being built at DuBois. Earlier the shop used the stud welders to apply studs to underframe members for attaching decking on flat cars which the B&O assembled.



Hydraulic cold riveter is used to assemble the diagonal-panel roofs and apply the run board brackets. This subassembly is then moved to the erecting shop where a second hydraulic riveter is used to attach the roofs to the top plates and ends of the box cars. At both locations the riveters have been located on traveling bridges and can readily be moved the car length which must be covered to accomplish the jobs.

*(Continued from page 43)*

major subassemblies such as center sills, complete underframes and complete sides.

The underframe shop was formerly the boiler shop. It now houses wheel and journal lathes, a truck assembly area, blacksmith shop, pipe shop, and—in its main bay



Five-electrode rivet heater along box car production line is one of 24 electric-resistance rivet heaters used throughout DuBois shop. The ability to handle various sizes of rivets while heating only those to be used immediately—along with absence of fumes and spilled oil, reduction in compressed-air consumption by the shop, and lower operating costs—have led to increasing ownership from the original three heaters. Triple- and single-electrode machines are used at other places in the shop where demand is lower.



Automatic nail driving with air hammers is recent innovation in the production line. B&O uses screwnails in the application of box car lining, and more than 3,000 nails per car has made mechanization of this operation an important goal.

—the assembly area for hopper and gondola underframes. The four-track erecting shop has one track for the hopper car production line, one for gondolas, and two tracks for the assembly of box cars. Both of these buildings are heated during cold weather. The four tracks in the erecting shop continue on out

through the paint shop.

Box cars are partially assembled outside. Underframes are placed on trucks, and sides and ends are hung on the underframes by an outside overhead crane and by locomotive cranes. These cars then move through the paint shop, and the first half of their indoor production line in the erecting shop runs counter to the general flow. The last half of this line does move in the same direction as those for the other two types of cars. All of the assembly operations are detailed on an accompanying diagram.

Currently nearly 700 men are engaged in these operations. This is principally a one-shift operation. Some equipment bottle-necks—such as the need for additional overhead crane capacity—have necessitated some second shift work. Since the shop was opened, an additional tread lathe, another air compressor and one more overhead crane have been installed to permit greater output.

### More Production

The B&O has pursued a policy of equipping DuBois with rectifier welders from the time it was changed from a locomotive shop. This type of welding machine is now used exclusively. At the time of the conversion, DuBois got three resistance-type electric rivet heaters. These have proved so successful that the shop now has 24 of these units and plans are underway to convert it completely to this type of rivet heating. Hydraulic cold riveters are used in the assembly and application of box car roofs. Considerable work has been done with hot paint spray and direct-to-metal paint.

Building size and the large number of cars being assembled crowds and complicates materials handling, but this has not interfered with shop output. Some large subassemblies such as sides and roofs must be moved to the assembly positions each night. Attempts are made to place enough of all the smaller parts at the assembly stations to operate the production lines without re-stocking during the 5-day work week.

Stores department stocks are maintained around all the shop buildings. Movement of this material



Stencilled after spray painting, Class N44 hopper is nearly ready for the road. Standardized model is replacing several earlier designs now undergoing rebuilding. DuBois shop has recently been turning out ten of these hopper cars, ten box cars and five gondolas each working day.

and other shop operations are conducted with the following materials handling equipment: two tractors, nine flat-top trucks, one platform lift truck, one boom and platform lift truck, four crane trucks, two 25-ton locomotive cranes and four 15-ton locomotive cranes.

All of the cars are being built with carbon steel. New car trucks are all equipped with ride control and older trucks being reused are fitted with snubbers. All cars get journal lubricators and dust-guard seals. Box cars are all equipped with lading anchors and steel flooring in the doorways. Gondolas get a B&O-designed composite wood and steel floor. Hopper cars originally built with outside stakes are being rebuilt with inside-stake side construction of the AAR design.

DuBois car shop, with its complete rebuilding operation in high gear, is not making an appreciable change in the total number of cars the B&O owns, but it is rapidly increasing the number of them ready and able to handle today's (and tomorrow's) traffic.

## UP Sands, Fuels Diesels Indoors

(Continued from page 37)

There are 66 exhaust hoods placed over the tracks to remove gasses generated while test-running engines. Each hood has its own motor and fan for exhausting the diesel fumes through the roof.

The center machine-shop platform consists of a concrete floor on an earth fill. Four small toilet rooms have been provided beneath this platform, and also a battery-charging room which is reached from the depressed-floor level of either section.

### Quick Charge for Batteries

Provision also has been made for giving a quick charge to batteries without removing them from the diesel units. This is done by means of G-E rectifiers permanently fixed to the columns which support the elevated platforms. These are placed

at 14 locations so as to reach all units, and they have clip-on leads so that they will be detached without damage if the diesel should be moved. In general, the quick charge can be made in an hour, but the rectifiers are equipped with cut-out devices which stop the charging after eight hours.

### Stores Facilities

Ramps are provided at the ends of the platforms to give fork-lift trucks access to each level from an adjoining stores building which houses the necessary supplies. The stores building, 35 by 100 ft. is placed on an outside concrete platform which has two car spots on one side and a truck tailboard at one end. Two locker buildings, one for enginemen and the other for the shopmen, were also constructed nearby.



Twenty miles of these Southern, steel-lined PS-1's have been built.

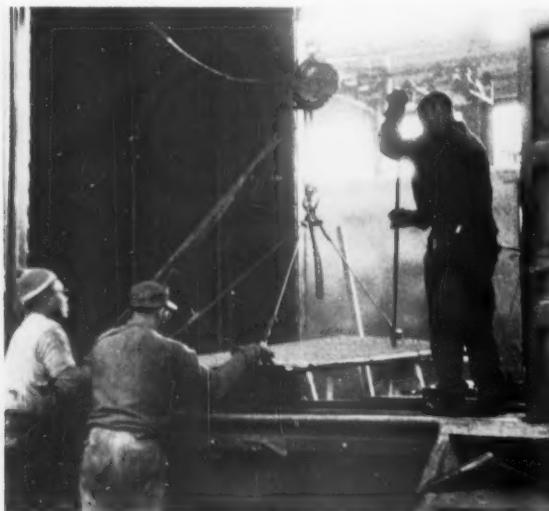
## Southern PS-1 Box Cars Have Steel Lining

The two thousand PS-1, 50-ton box cars built for the Southern Railway at Pullman-Standard's plant in Bessemer, Ala., point up the flexibility of Pullman's standard design. Several features in these cars make them different from the standard PS-1. The length is 50-ft 6-in. instead of 40-ft 6-in. The door openings are 9 ft wide, the same as specified by the Southern for its 40-ft 6-in. cars built in November 1951.

The cars are steel lined to a height of 6 ft. The  $\frac{3}{16}$ -in. lining is applied in sections, each section being welded to the side posts, with the welds ground down to make a smooth surface for the application of a neoprene coating. After the lining is cleaned of rust, one light roller coat of neoprene primer is applied, and dried overnight. Then, five coats of liquid neoprene are applied with a paint roller—one light coat and four successive coats,

each as heavy as possible. This is done as a precaution against condensation, rust and lading damage. Twenty gallons of liquid neoprene are used in each car.

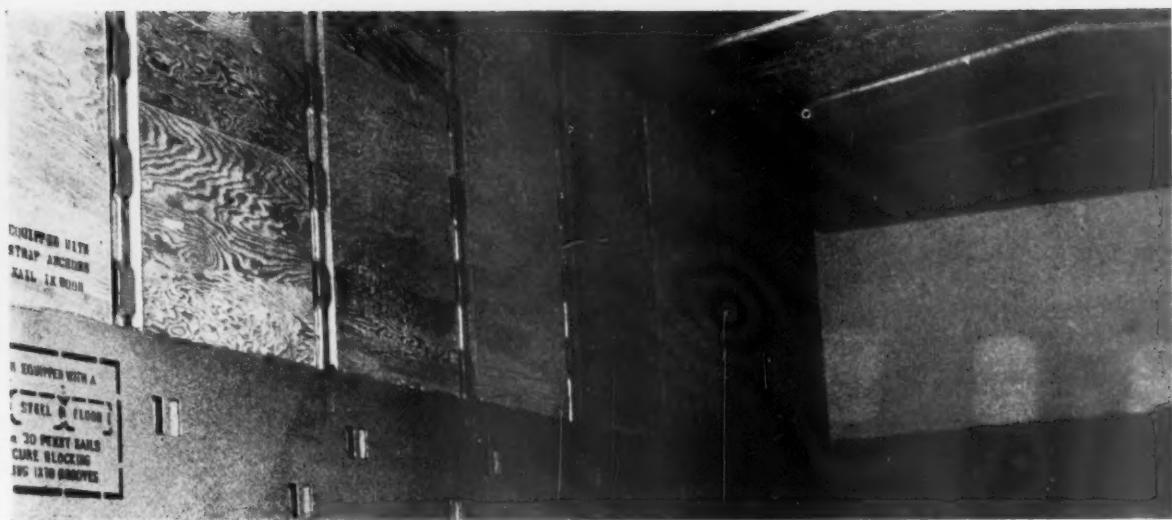
Each quarter section of the steel lining (from the door opening to the end of the car) contains 55 slots for lading protection strapping. Above the lining are plywood sections, divided by P-S lading strap anchors—30 to each car. Each lading strap anchor, containing 5 slots, is



Sections of P-S nailable steel floor are easily installed.



Nailing posts for lading strap anchors lined up for application.



Ends and sides have lower portions lined with steel. Plywood is used above steel.

mounted on a nailer post, which is bolted top and bottom to the side posts. The cars are equipped with the P-S nailable steel floor, an optional type specified by the Southern.

Conventional P-S construction was used elsewhere throughout the car, including the precision welded underframe, the two-piece welded and corrugated end, riveted roof, and one-piece car sides. All the cars were given a water test during construction, and the stencilling was applied just prior to shipment.

The light weight of the car is 60,700 lb.

Pullman-Standard has recently received an additional order for 200 of these cars, to be equipped with cushion underframes.



Slots in neoprene-coated steel lining form lading strap anchors.

One of five coats of neoprene applied with a roller to steel lining.

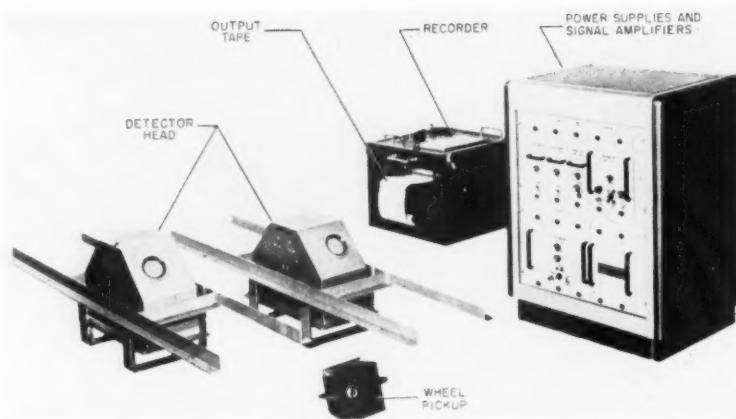


# Here's an Electronic Hot Box Detector

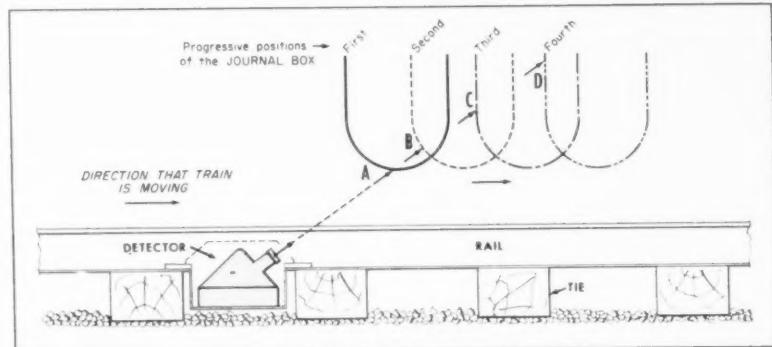
The Chesapeake & Ohio and Reading are operating hot box detectors designed by the Servo Corporation of America. Much early development work was done on the Norfolk & Western and the Pennsylvania. Already the device has located one C&O hot box which the road says could have caused a derailment. During early experiments on another road, the device located an overheated journal fitted with a lubricating pad. Sometimes these journal lubricators do not give the external indications associated with overheated waste packing.

The top of the journal box has the most direct metallic contact with the journal bearing and this area gives the best indication of journal temperature. Experiments indicated that the temperature of this portion of the box could be measured by means of its infra-red radiation at distances up to 5 ft. Servo devised the arrangement of "sighting" upward at an angle of about 40-deg in the direction of the train's travel. The detector is located about 16-in. outside the gauge line of the rail. It has a meniscus lens which "views" a very narrow band up the journal box as it recedes away from the detector. This narrow sight path does much to eliminate erroneous indications from other heat sources such as hot brake shoes, hot wheel rims and steam traps. In addition, there are two wheel-actuated electro-magnetic transducers which keep the detector circuits energized only while the wheel is passing between them. It is during this period that the detector "views" the box.

The detector is protected by a metal enclosure with a shutter over the pyrometer lens. This shutter opens as the train approaches and closes after it has gone. Indications from the detector are placed on a paper tape monitored by an employee on duty at the wayside recorder. Servo is developing an arrangement which would convert hot journal indications directly into a signal aspect which would cause the train to be stopped. The tape can be analyzed to indicate which car has the hot box, and this same information might be produced with a counter in an automatic set-up.



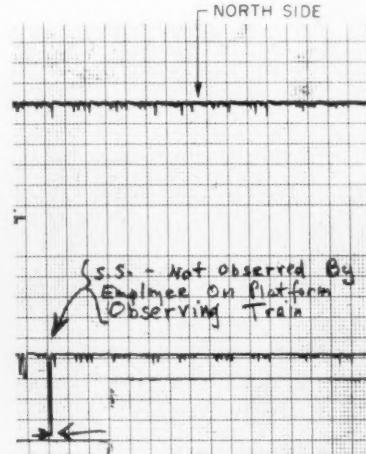
Components of Servo hot-box detector system convert infra-red journal temperature indications into paper tape record at wayside station.



Principle of detection system is to "sweep" box or side frame as it passes. Its infra-red radiation is picked up by pyrometer in detector.

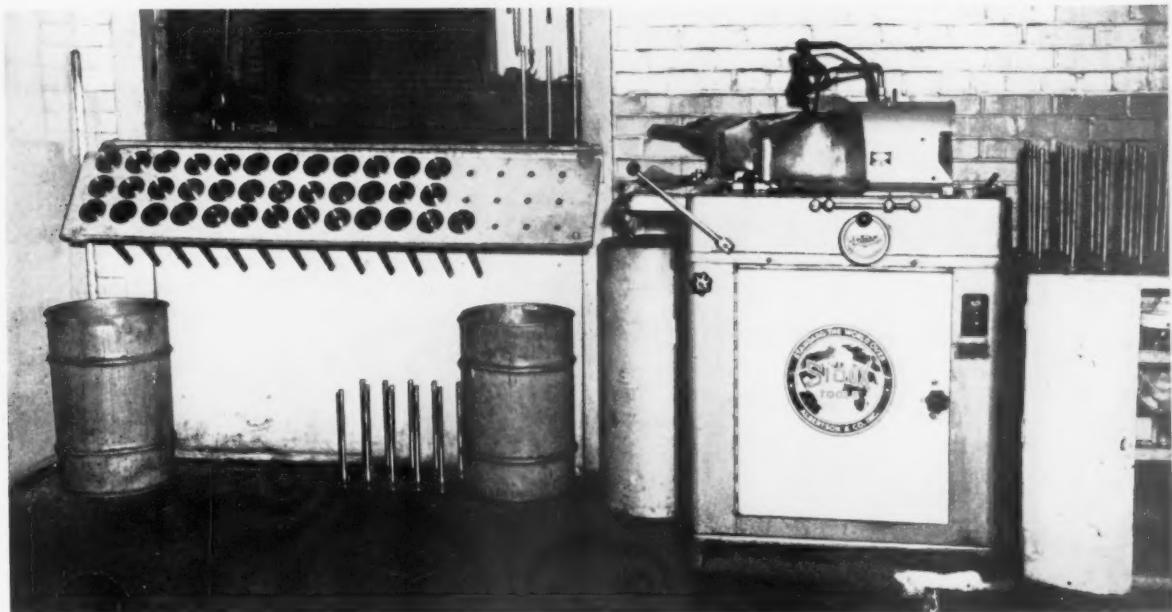


Installation places two of these detectors opposite each other and outside the two rails. Transducers are clamped to each rail beyond detector to energize and de-energize the detector circuits.

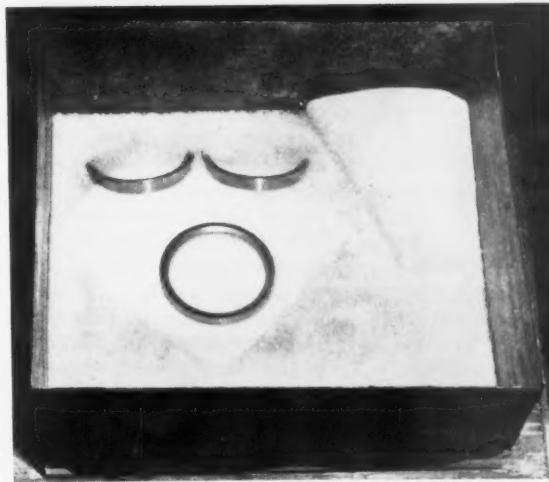


Indication at wayside is checked by operator. Temperature of each box is indicated. "Pip" marking hot box is usually five times higher. Roller bearings run at similar temperatures, complicate automatic detection.

# Ideas for the Diesel Repair Man...

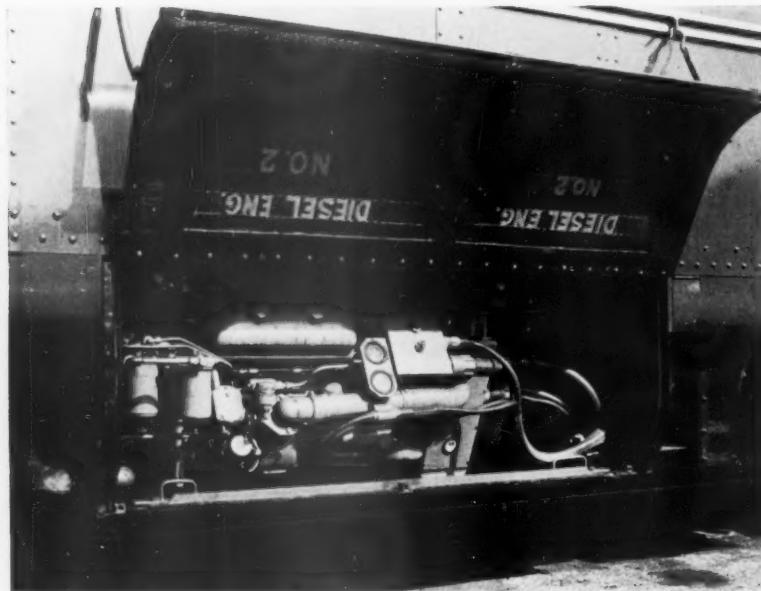


Rack for storing Alco valves next to grinder in a Western shop. A similar board mounted at 45 deg is used for EMD valves.



Valve seat inserts shrunk in dry ice and alcohol for easy insertion with a hand tool. The inserts are turned .0035 to .0045 in. oversize in diameter and chilled to between minus 65 and 75, which takes 20 to 30 minutes. Both stellite and softer seats are used, the latter being put in heads with older type valves.





One of the undercar power plants which provided 18,000 hours of satisfactory service before being given a major overhaul.

*The energy required for both cooling and heating can be generated on each car of a passenger train. Both undercar power plants and reverse cycle heating are practicable.*

## Independent Car Goes Anywhere.....

LOCOMOTIVE-HAULED passenger cars can be completely independent of the locomotive for everything except traction. The energy required for both cooling and heating can be generated on each car.

There are two main methods of accomplishing this scheme of heating without the use of train line steam or individual oil-fired car heating systems, namely undercar diesel engine-driven power plants, and reverse cycle heating.

### Undercar Power Plants vs Head-End Power

The Pennsylvania has a total of 12 cars equipped with undercar power plants which have been in successful operation for nearly five years. The units are now being given a major overhaul after more than 18,000 hours of service. These units which are on dining cars and coffee

shop cars (two units per car) consist of a 25-kw, 220-volt, 3-phase, 60-cycle, 1,200 rpm alternator, direct-connected to a General Motors, Detroit diesel 2-cycle, 3-cylinder engine. Waste product heat from the jacket water of these engines is used to heat the car in the winter season and waste product heat from the engine exhaust gases is used to heat service water at all seasons of the year.

Recently built, lightweight trains develop power for train facilities from power cars or from the locomotives. In comparing the total first cost of the individual undercar power plants with the total cost of a head-end system, including the cost of a power car, switching and transmission line, the head-end system will be considerably higher in first cost. Further, the head-end power car is a non-revenue unit and represents additional drag on the lo-

comotive. If a power car is not used for head-end power, the central source of electrical power must then be placed in the locomotive. There is not sufficient room in existing locomotives to accommodate two generating units and associated controls. If existing locomotives are not used, then a large expenditure will be required for the new locomotives.

Individual diesel-operated power plants on each car provide power for all train power requirements. Actual figures on cost of maintenance are not available but the following is a comparative analysis of this problem. From a maintenance standpoint, the individual undercar power plants may be slightly higher than that of the head-end system, but this will be offset to a large extent by maintenance on the trainline switching and transmission systems.

As far as operation is concerned, considering flexibility and reliability,

the individual car has a decided advantage over the head-end system. The car is self-contained, and can be operated anywhere. Further, a failure of the trainline transmission system affects all the cars in the train, causing the car electrical and air conditioning apparatus to become inoperative; whereas, a failure of an undercar power plant affects only that car. Also, any failure of truck or brake system on the power car necessitating its removal from the train means annulment of the train, unless protect power cars are provided for this type of emergency.

#### Reverse Cycle Heating

Reverse cycle heating for railroad cars is not new. The Pennsylvania had two cars equipped with this system in 1935, and they operated satisfactorily for several years. The manufacturer of the apparatus then decided to leave the field, and the apparatus was removed from the cars because repair parts were not available.

Cars having reverse-cycle heating will be supplied with electrical energy in the yard from the 220-volt, 3-phase, 60-cycle standby facilities. During the cooling season, the heat is absorbed by the evaporator and rejected to the atmosphere by the condenser. In the heating sea-

son, the refrigerant cycle is reversed and the outside heat is brought into the car.

When the car is in service, electrical energy is obtained from an axle-driven motor-generator set. The motor-driven compressor is a 2-stage 3-cylinder unit, rated 10 tons, driven by a 15-hp motor. The two-stage unit has a considerably higher efficiency than a single-stage unit. Hence, correspondingly higher tonnage can be obtained for the same power input with the two-stage unit. During the cooling season, the compressor will be operated at a lower speed because only eight tons are required.

Further on a thermal basis, the reverse cycle system compared with direct electric heat is approximately two to one for the same power input. This gain in heat arises from two sources, namely, heat from the outside air and heat of compression.

As far as first cost is concerned, this system will be somewhat higher than that of the undercar power plant scheme, but considerably lower than that of the head-end power method.

From a maintenance viewpoint, it will be substantially the same as that of the undercar power plants.

From an operational standpoint, the reverse cycle system has the same advantages of flexibility and

reliability as that of the undercar power plant scheme.

In comparing these systems with conventional steam heating of cars, the following disadvantages of steam heating must be evaluated.

1. In cold weather, the length of the train must be limited to avoid poor heating of the rear cars.

2. Loss of train time and additional labor required to thaw frozen traps and trainlines enroute.

3. Cost of generating steam at the various terminals and coach yards.

4. Cost of maintaining these steam generating plants and distribution systems at the terminals and coach yards.

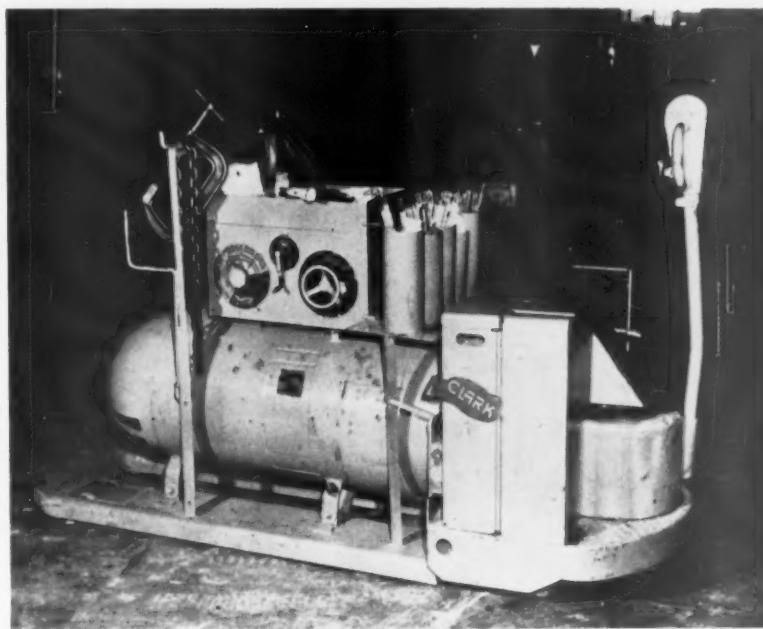
5. Yearly maintenance of the steam heating systems on the cars and locomotives.

Frequently, in analyzing this problem of car heating, all the costs of steam heating are not carefully considered, and only the items relating directly to the operation of the car are included. Another handicap for the independent car is that the necessary equipment raises the first cost of the car. However, both undercar power plants and reverse cycle heating are practicable, and when all phases of the problem are properly evaluated, they apparently offer a considerable improvement in overall economy with better utilization of cars.

### Self-Propelled Portable Welder

BY PERMANENTLY MOUNTING a welding set on a Clark battery-powered hand truck, the welding operators in this shop were able to considerably reduce the time required for on-the-spot repair jobs. The 450-amp welding machine is bolted to the forks of the pallet-type truck and the control panel is welded to the top of the motor case.

On the front end of the unit scrap angle irons and a thin sheet were fabricated into a table. Five round steel containers were welded to the table to hold welding rods. At the rear, scrap angle irons were set up to form a frame from which clamps, cable and other equipment may be hung. The unit carries 50 ft of cable for power supply and 20 ft of welding cable.



# 3

## Roll Them Out Like New

### Disassembling Equipment Requires Skill and Understanding

NOT ALL EQUIPMENT DAMAGE can be blamed on shipment. Even though the apparatus reaches the shop undamaged, the hazard of handling still remains. The shop, like a hospital, should be a haven of safety and security. But there is no magic in simply passing through the doors that guarantees this. Only the skill and understanding of the workmen can make it real. For instance, tilting a generator so as to cause the armature to slide in its bearings is just as damaging when it happens in the shop as when it happens in the field.

#### Care Still Needed

Even though the assembled machine has survived all the hazards of handling in the field, the roller bearing is not yet safe. It may be wrecked when the armature is moved in or out of the frame. The weight of the armature should not be allowed to slide on the bearing rollers as it is moved. Also, care should be taken to move the armature evenly and in a line so that it doesn't cramp between the rollers. If the frame head with its bearing is removed first, there is not as much weight to handle. However, it can still cramp the bearing if it isn't balanced in the hoist. Cramping can create terrific pressures on the rollers. These pressures can easily exceed that caused by armature weight. Damage

This is the third article in a new series covering heavy maintenance of locomotive electrical equipment.

Part 3 is written by J. W. Teker, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

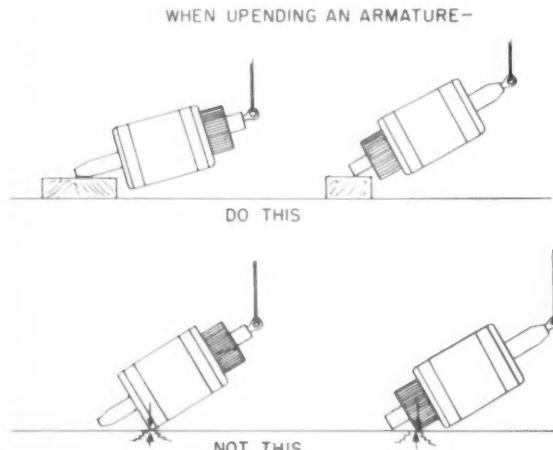


Fig. 1—Right and wrong methods of upending an armature.

from cramping is identified by heavy marking on opposite sides of the bearing races.

In view of these precautions it is well to consider how best to do the job of disassembly. Some shop people like to move armatures in and out horizontally. A good job can be done with shaft extensions, double hoists and special slings. Others think the risk is less if the machine is upended and the work done in a vertical position. This method has a number of advantages when it comes to handling the heavy field coils, pole pieces, frame head and even the armature, for easy, direct vertical lifts can be made with a hoist. Usually the facilities available, the builder's recommendations and personal preference are the deciding factors. In any case, if you know what to look out for and understand what must be done, you can work out the method best suited to your needs.

#### Field Coils

If a complete machine can get into trouble during handling, its individual parts after disassembly are in even greater danger. Take the heavy exciting field coils of a traction motor or generator as an example. There is a great temptation to drag or slide them from place to place rather than lift them. The outer insulation of

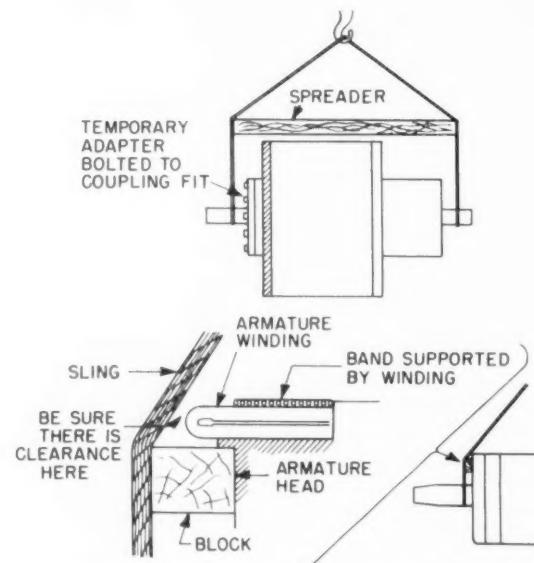


Fig. 2—Precautions when using slings to lift armatures.

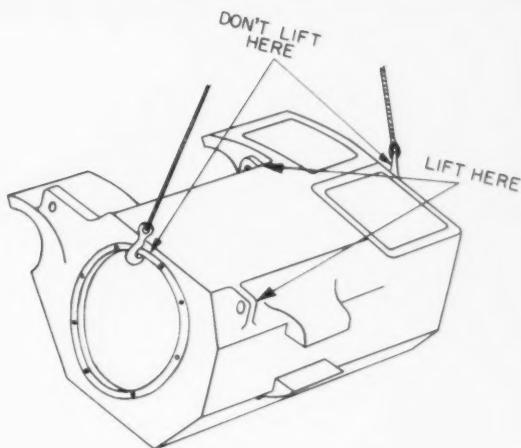


Fig. 4—Crane hooks should be attached to lifting bails, not to accurately machined frame-head bores.

these coils can withstand high compression without damage when it is squeezed between the pole piece and the frame. But if it is rubbed across a rough surface, a sharp edge, or a nail head in a shelf or bench it cuts through. A very frequent source of grounded coils is steel chips imbedded in the insulation. This results from setting coils down on unswept surfaces, such as fork truck pallets or stock room floors. Unfortunately the damage is on the under side and the coil must be turned over to see it. Even then you can miss it unless you are looking for it. Sometimes it can be felt better than seen. But such close inspection is rare and the defect is usually found by high-potential test. Worse yet, it may go undetected and cause a failure in service. This shows the need for cleanliness and good housekeeping, and for separating machining operations from assembly.

#### Armatures

Most important of all, know the job and the strong and weak points of the parts you handle. Probably the best example of this is an armature removed from its frame. The shaft is the strong backbone of this part. Even so, it has its touchy places. The centers on each end of the shaft are on example. They are the necessary reference points for the life of the armature. Don't clobber them up with sledge hammer blows or the un-

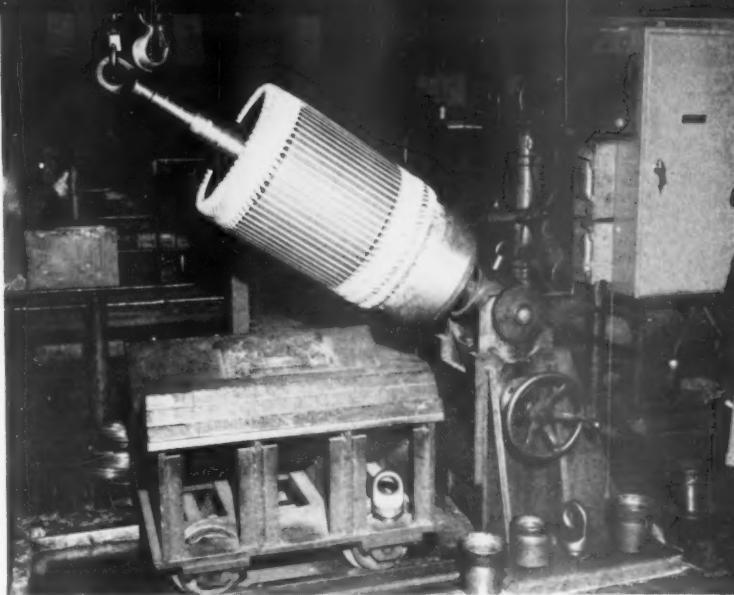


Fig. 3—One type of fixture used for upending armatures.

distributed pressure of a powerful hydraulic press. The bearing fits are machined to half thousands tolerance. Protect them from rust or nicks. This goes for the tapered pinion fit also. A hand file used to remove a nick can take with it valuable contact area. Wooden cradles are frequently used to support shafts during shipment. It would be hard to find a more suitable material for this purpose. Watch out, though, for sap or moisture in the wood. They can cause a badly rusted spot. First protect the shaft with slush or wrap it with a vapor-barrier or rust-preventive paper.

The core, or magnetic part of the armature is heaviest. Yet in many ways it is weak. It is made up of hundreds of thin iron sheets pressed into a compact stack with a thin coating of insulating varnish on each sheet. There is a good reason for this construction. The same magnetic force which causes electricity to flow in the copper armature coils would also cause current to flow in a solid iron core. This would overheat the machine and burn it up. So it is necessary to slice the iron up and put insulation between the sheets to hold the core current to a low value. Anything that breaks down this insulation and connects the iron sheets (laminations) will increase this core current. So, be careful not to file, jam or drag these laminations together.

Handle the core with care, it's not just a chunk of

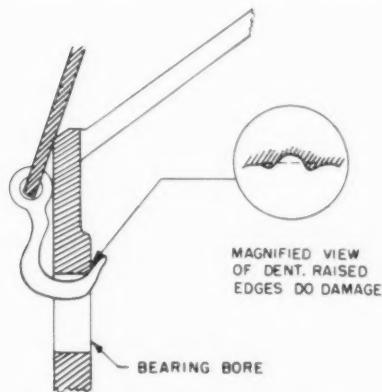


Fig. 5—Hooking into bearing bore when lifting frame head can do serious damage.

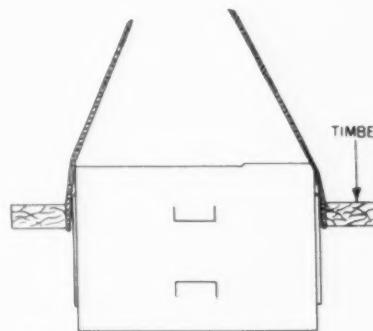


Fig. 6—A timber can be used to protect machined surfaces when lifting a magnet frame.

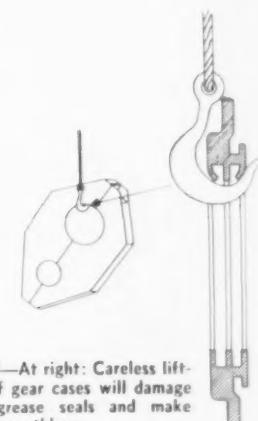


Fig. 7—At right: Careless lifting of gear cases will damage the grease seals and make them worthless.

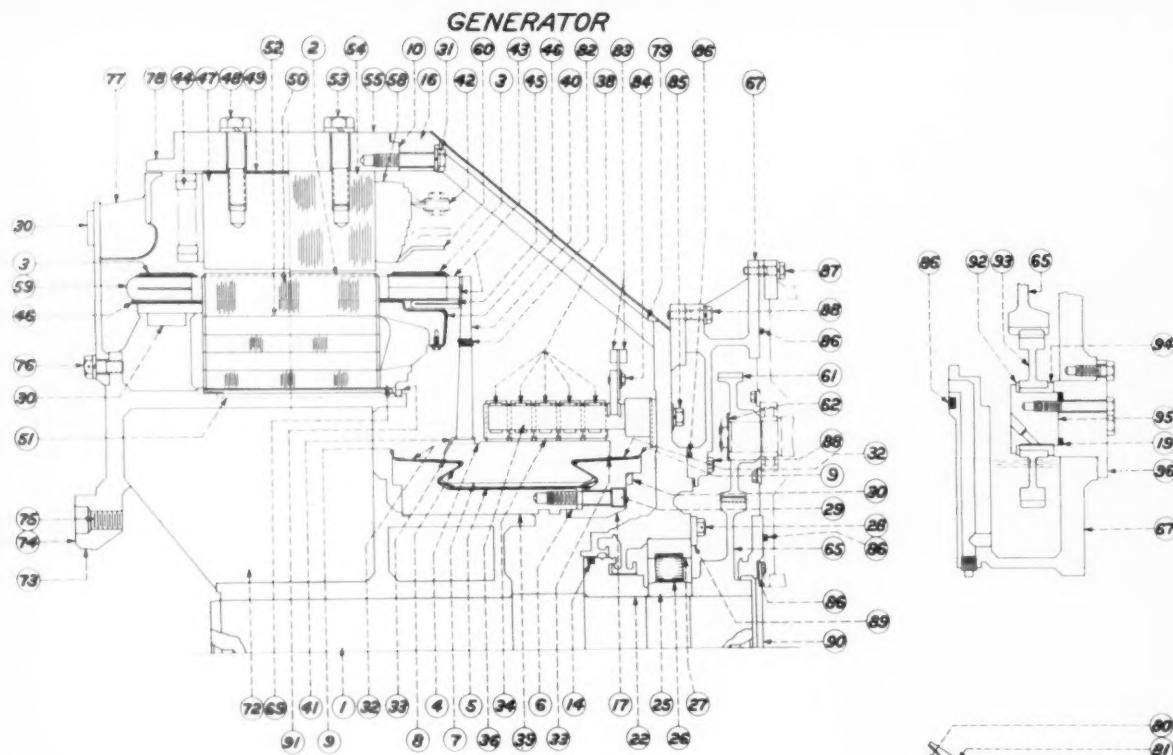


Fig. 8—Nomenclature chart for motor (on facing page) and for generator (above).

1. Armature shaft	32. Commutator string band
2. Arm. coil retaining wedge	33. Commutator seal
3. Arm. binding wire & clips, comm. end, pinion end, or fan end	34. Carbon brush
4. Commutator dust groove	35. Brush holder clamp
5. Commutator shell insulation	36. Brush holder stud
6. Commutator cap & shell fit	37. Bolt, brush holder clamp
7. Commutator segments	38. Brush holders
8. Commutator cone insulation	39. Commutator shell
9. Commutator bead ring	40. Commutator riser
10. Frame head & mag. frame fit	41. Mica segment
11. Axle bearing lining	42. Comm. field coil terminal
12. Axle bearing lining flange	43. Armature coil lead, top & bottom
13. Wheel hub	44. Commutating field coil
14. Felt seal	45. Equalizer
15. Axle lining flange dust guard	46. Armature head insulation
16. Frame head, commutator end or pinion end	47. Commutating pole piece
17. Commutator cap	48. Commutating pole bolt
18. Bearing cap, inner comm. end, or pinion end	49. Commutating pole shim
19. Gasket	50. Armature core punchings
20. Flinger	51. Armature core key & keyway
21. Roller bearing separable lip or H-piece	52. Armature core air holes
22. Cellar	53. Exciting pole bolt
23. Bearing cap, outer comm. end or pinion end	54. Exciting pole piece
24. Bearing retaining nut	55. Magnet frame
25. Roller bearing, inner race	56. Steel pad for exc. field coil
26. Roller bearing, roller	57. Spool flange
27. Roller bearing, outer race	58. Exciting field coil
28. Cap screw or bolt	59. Armature coil, loop end
29. Commutator bolt	60. Exciting field coil terminal
30. Balance weight	61. Pinion
31. Bolt, frame head, comm. end, or pinion end	62. Pinion nut & washer
	63. Bearing seal collar, P. E.
	64. Hole for gear lub. return
	65. Gear
	66. Gear lubricant deflector
	67. Gear case
	68. Axle
	69. Armature head
	70. Oil seal washer, axle side only
	71. Bolt lock piece, axle side only
	72. Armature spider
	73. Coupling fit bore
	74. Couplin fit face
	75. Coupling bolt holes
	76. Fan bolt
	77. Fan
	78. Engine—gen. mounting fit
	79. Frame head arms
	80. Commutator cover
	81. Commutator cover latch
	82. Commutator riser tie
	83. Brush holder bus rings
	84. Brush holder stud terminal screw
	85. Bolt for brush holder stud
	86. Gasket for gear case
	87. Auxiliary machine mounting bolt
	88. Gear case mounting bolt
	89. Bearing clamp ring
	90. End cover
	91. Armature head lock key
	92. Oiling gear thrust washer
	93. Oiling gear
	94. Oiling gear bearing
	95. Oiling gear shaft
	96. Oiling shaft support
	97. Axle cap inspection cover
	98. Axle cap filler cover
	99. Wick lubricator support
	100. Axle cap
	101. Pusher plate spring
	102. Drain plug
	103. Pusher plate
	104. Wick lubricator
	105. Axle cap bolt
	106. Axle lining key
	107. Locking device

Section through motor support bearing—commutator end.

iron. Don't drag it lengthwise across a bench or floor. This might bend or flare the teeth of the laminations at the ends of the core. It is almost impossible to press such flared teeth back against the core. They have no support when flared away from the core and will buzz when the machine is in operation. Ultimately such teeth break off and can jam in the machine. If a broken tooth can't escape, it rattles around in its pocket like a pea in a pod. This chews out coil insulation and leads to a ground failure.

When an armature is rolled for even a short distance, make sure that the surface over which it rolls is smooth and clean. A heavy armature can't roll over nails, bolts or nuts without being dented and damaged. It is easy to jam a chip into the winding, or to crush or break off the end of a slot wedge.

The edge of the core is the weakest spot because here the thin laminations have the least support. Some cores have fingers or extra heavy punchings for support of the thinner laminations. Even these will give way, however, if the entire weight of the armature is tipped onto its edge. This will crush the teeth and damage the armature winding enclosed by them.

The core slots and wedges enclose and efficiently protect the slot portions of the armature coils. But after the winding leaves the slot it is exposed and helpless. A banding of steel wire covers part of these exposed ends. Don't let that give you a false sense of strength, however. Remember, the winding supports the band. Any blow or dent inflicted on the band is passed on to the winding underneath. And this winding is no stronger

than the mica, glass, cloth or varnish insulation covering and separating the copper conductors.

The end of the coil opposite the commutator—called the nose, knuckle, or loop—is the part most frequently damaged by careless handling. It sticks out like a chin and attracts trouble. Watch for it.

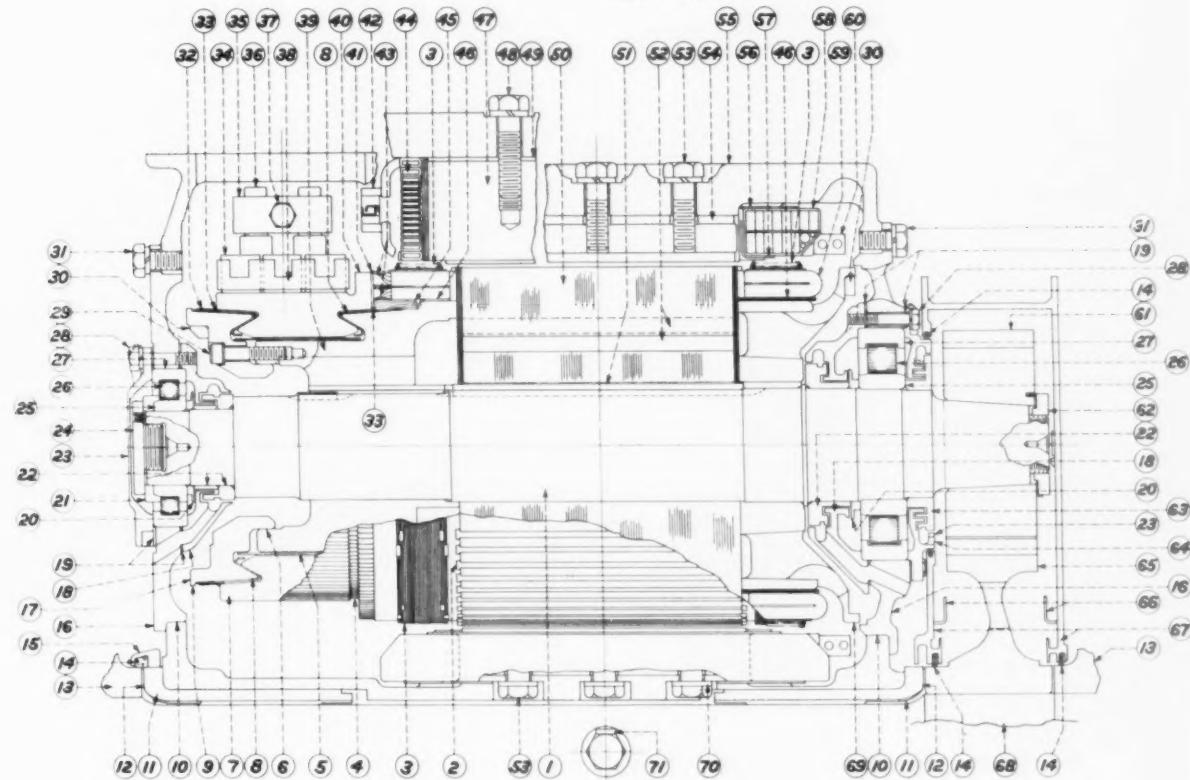
Assembled in its frame, this part of the armature works year after year without trouble. On rare occasions some misguided soul will pry on these loops or knuckles when he wants to bar the armature over. They look like a "natural" for this purpose. Soon after such treatment the armature comes into the shop. Then you have a rewind job on your hands; or else a challenge to your skill—like a surgeon—to save it with a repair job.

More frequently this part of the winding is damaged simply because it sticks out where it gets hit or crushed. Careless turning of the armature between horizontal and vertical positions can bring all its crushing weight on these loops. For safety's sake, place a block under the end of the shaft, Fig. 1 to act as a pivot so there is no pressure on the end windings. If armatures must be turned frequently, as in a shop, a fixture with a hinged pocket for the end of the shaft, Fig. 3, is safer and quicker. If a sling is used to make horizontal lifts, make sure that it doesn't dig into the end windings. A spreader or block can be used to keep the sling away from the winding.

#### Commutators

Probably the least understood part of the armature

### MOTOR



is that combination of copper steel and mica called the commutator. It is the switching device that makes a direct current machine possible. Its hundreds of separate copper segments are sandwiched between comparatively softer mica strips. The commutator surface must be smooth and round. As we shall see later, this surface is maintained by a delicate balance of internal forces. Surface blemishes, such as nicks in the copper can be seen. A bump that doesn't leave a visible mark is worse. It may upset the delicate balance by depressing a section of the surface and cause a low spot. Such a spot may remain invisible until it causes trouble in service, or until you hear or feel the brushes click when it passes under them.

Avoid making lifts on the commutator or blocking under it. Use the same care to keep the armature weight from pressing on the outer edge of the commutator when upending the armature as you did with the end winding. Place a block under the end of the shaft, Fig. 1, to take the load or you will sink the ends of the bars.

When you are not working on the commutator, protect it with a wrap of cardboard or a felt-lined metal guard. Then, if it is bumped the pressure will be spread over a larger area and there will be less force in one spot. This protection also safeguards the surface against nicks, scratches, and spots of paint or grease.

If an armature must be supported use blocks under the core that are cut to fit, and steady it by blocking around the shaft. When shipping an armature it is best to use a box. This can have built-in skids and cradle blocks, and be fitted with a waterproof lid.

#### Frames and Frame Heads

The non-rotating parts of electric machinery look husky enough, but they also have their sensitive points. A good example is the frame-head bores with their accurately machined surfaces. These form a tempting place to attach crane hooks when lifting the frame, as shown in Fig. 4. Doing this can leave a serious dent with raised edges in the machined surface. Such handling shows that the shop man either has a devil-may-care attitude or just doesn't know his job. Someone

must take time to dress out a dent like this before the machine can be assembled.

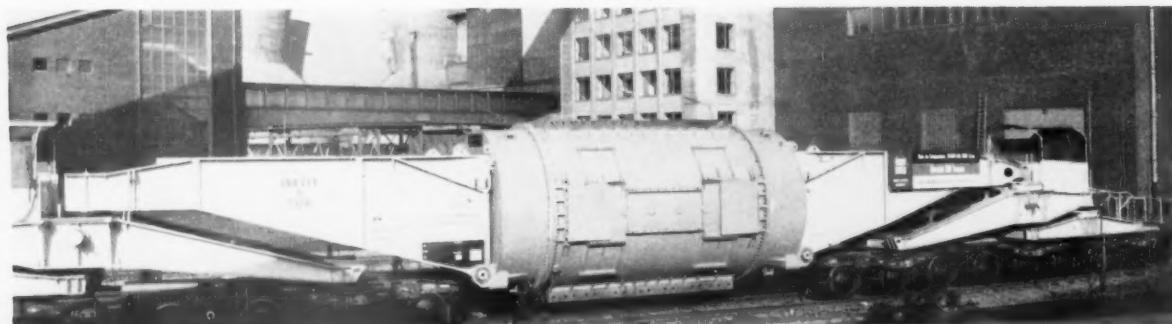
Even worse is the practice of hooking into a bearing bore, as shown in Fig. 5. Damage of this kind may go undetected at assembly. Then it can cause misalignment of the bearing or throw it out of round. When the bearing shows up noisy on a listening test it is no picnic to hunt down the cause of the trouble.

Another much-abused piece of equipment is the traction motor gear case. When you look at it, it is a dirty messy thing; but it has an important job. Don't let its appearance fool you, for it has an important job to do. Locomotive gearing must transmit high horsepower and tractive effort between the motor and the wheels. The gear case enables the gears to do this job. It holds the lubricant they need, and also keeps grit and stones out of the gearing. But it will fail in this job if the seals around the openings are damaged. So don't yield to the temptation to put a crane hook into the pinion or axle bore, Fig. 7, when lifting the case. The edges of the slots for the felt seals are easily bent or broken. There just isn't space here for husky seals, so be sure to handle them with care. A minute rightly spent will avoid damage requiring hours to repair.

#### Knowledge Begets Care

There is no substitute for a thorough knowledge of the anatomy of the machines you are handling. The nomenclature chart, Fig. 8, will help you to identify the principal parts of motors and generators. Most of these are well known, but some part names may vary with the builder. Take every opportunity you can learn more about the machines you work with so you will understand their points of strength and weakness. It is easy to devise proper lifts, once the need to respect machined fits and surfaces is understood. Good work here is the mark of a man who knows both his job and his machines.

Whether we are working in a hospital or a repair shop, the same principle applies. A moment of thoughtless or careless handling can undo the finest and most skillful work.



A three-part railroad car for carrying extra heavy loads is now in service on the Swiss Railroads. Like the three-part Westinghouse car described in the April 1957 issue of *Railway Locomotives and Cars*, the center section is the load itself.

When the car is moving light, the two end sections are coupled together to make a two-part car.

The load is suspended between two trusses which distribute the load proportionately on the two rolling parts, each having three 6-wheel trucks. The load is so mounted that it may be displaced 1.15 feet to

either side to allow greater lateral clearance on curves.

The dead weight of the car is 201,500 lb and the load capacity is 605,000 lb. The length of the car without load with both parts hooked together is 110 ft.

It is said the car greatly influences the capacity of new power plants which are being built in the area. The Transporter is shown carrying the stator for a 214,000-kva power plant generator from the Brown-Boveri plant in Munchenstein, Switzerland to Frimmersdorf, Western Germany.

### Starting an Engine . . .

By Telephone



By Gordon Taylor

A FREIGHT TRAIN, hauled by two GP9 units in multiple, came to a stop a long way from home. The engines would not load and the PCS light was burning, which seemed to indicate an open PC switch. Then both units died, and the crew tried everything they could think of to restore service. There had been no reason for the PC switch (air-operated) to open. The air pressure was okay, and air brakes had not been applied at the moment of failure.

After some 30 minutes delay, the crew was able to contact the diesel shop foreman by phone. He suggested that the crew close the control and fuel pump circuit breaker, and also the engine run circuit breaker on the rear unit. When this was done the engines were started without difficulty. The locomotive was back in business after about a one hour delay. Incidentally, the PCS indicator light continued to burn for the balance of the trip.

It was embarrassing to the engine crew to have such a delay, when such a simple remedy was available. The engineer and fireman decided to have this case of trouble thor-

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

oughly explained to them, and when they reached the home terminal, they called on "Doc" Watts, the electrical foreman.

Kelly Watts was glad to cooperate. But he first wanted to definitely locate the exact cause of the trouble. He reasoned that the pneumatic control relay (PCR) was involved because the crew had reported that one of the first trouble indications was the burning of the PCS open light. This light burns when current flows through the e-f interlocks of an open PCR. The question was, what caused the PCR to stand open? It was quickly found that the PCR coil was open, and it was necessary to replace it with a new coil to make permanent repairs.

With the trouble definitely identified and corrected, Watts outlined the case to the engine crew, tracing the circuits on a schematic wiring diagram. He explained the case as follows:

To start the diesel engine and control its speed from the throttle, the control-and-fuel-pump and the engine-run circuit breakers must be *On*. To move the locomotive, the generator-field circuit breaker must also be *On*.

The control and fuel pump breaker when closed on the lead unit energizes the PC wire, one of the wires in the control cable that runs throughout the locomotive. The PC wire has a tap leading to the throttle control, which in *idle* position closes a circuit through pneumatic control switch (PCS) which is an air operated electric switch. The closed PCS passes current to the operating coil of the pneumatic control relay (PCR).

The PC wire has another tap leading directly to the operating coil of the fuel pump contactor (FPC). When FPC is energized its interlocks c-d serve to provide a holding circuit through coil PCR when the throttle is moved off the *idle* position

to all *run* positions. The PC wire also has a tap passing through the isolation switch that makes it possible to energize the starting contactor when the start push button switch is pressed closed. The PC is a very important wire.

It is now time to consider what the *engine run* circuit breaker does in the control system. When this breaker is closed, it energizes the fuel pump (FP) wire which runs throughout the locomotive. It energizes the FP wire provided the a-b interlocks on PCR are closed. The FP wire when energized carries current to the fuel pump controls on the trailing units. It also carries current through the isolation switch to the engine relay (ER) in each unit. The engine relay in turn controls the current supply to the A, B, and C solenoids of the electro-hydraulic governor control, that controls engine speeds. De-energizing the ER will stop the engine if the throttle is in *Run 5* or *Run 6*, or will bring the engine to idle, if in any other throttle position.

The engineer wanted to know how the PCS light got into the act. The electrical foreman explained that the warning light had nothing to do with it except that it indicated that something had happened to the PCR.

The PCR tied in as the cause of the trouble because its open coil circuit caused its a-b interlocks to interrupt the circuit between the engine run circuit breaker and the FP wire.

The FP wire carries current to



the fuel pump controls and to the engine relay which is necessary to energize the A, B and C solenoids in the engine governor. Since the FP wire was dead on the control unit, it caused a failure of both units.

From the information phoned in to the diesel house, it appeared necessary to energize the control system from the rear unit. It happened that only the engine run circuit breaker needed to be closed on the rear unit

to restore control current on the control unit. However to be safe, it was suggested that both the control and fuel pump breaker and the engine run breaker be closed on the rear unit.

## How Much Do You Know About Brushes

### How Significant Are Brush Connections?

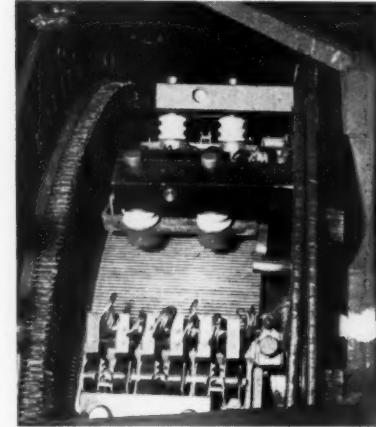
A BRUSH CONNECTION must be designed to carry the maximum current load, and be of uniform low electrical resistance, free from mechanical failure, and able to withstand the fatiguing effect of constant vibration and shock through the life of the brush. An inefficient connection can be a source of additional heat to the commutator because of the  $I^2R$  or heating effect caused by high resistance. Inadequate cable size or poor carbon-to-connection contact results in unnecessary heat and power loss. Connections which do not remain stable at their initial low resistance level become inefficient electrically. If the difference between connection resistance of brushes in the same holder becomes great enough, the major portion of the current will flow through the brushes with the lowest connection resistance. This is called selective action. It can cause differences in the appearance of the film tracks and excessive heating of the brushes. It is especially undesirable on generators.

Most railroad people are familiar with the troubles which can occur as a result of the mechanical failure of brush connections. With certain types of riveted or tamped (plug) connections the brush tends to break at the connection thus allowing the loose shunt to dangle. Eventually, it causes a flashover or trips the ground relay of the unit when the shunt comes in contact with some

part of the frame or mechanism which can serve as a ground. In the early days of the diesel locomotive, this type of failure reached epidemic proportions on some roads due to extremely severe operating conditions. Thanks for brush connection development, this type of failure is eliminated when connections are used which are designed to withstand the stresses present on diesel locomotives.

Fatiguing or fraying off of shunts on connections has had a history parallel to that of mechanical connection failure. Here, too, development work has produced a satisfactory connection. However, based on the past experience, it seems quite probable that no connection material tested today has sufficient fatigue life to outlast the life of a second or possibly third set of traction motor brushes if the connections were to be re-used. A tight connection is essential if the cumulative effect of high resistance and heat is to be avoided.

There have been many, many proposals and patents of novel connections each of which theoretically had something better to offer. The rigors of actual service have served to lead to the present day standard connections used on diesel motors and generators. Usually, the proposals have been made for economic reasons and give little consideration to the efficiency of the connection or the job it must do. Experience has shown that the stresses imposed on a connection will quickly shake it loose if it is not firmly connected to the brush. The slightest loosening

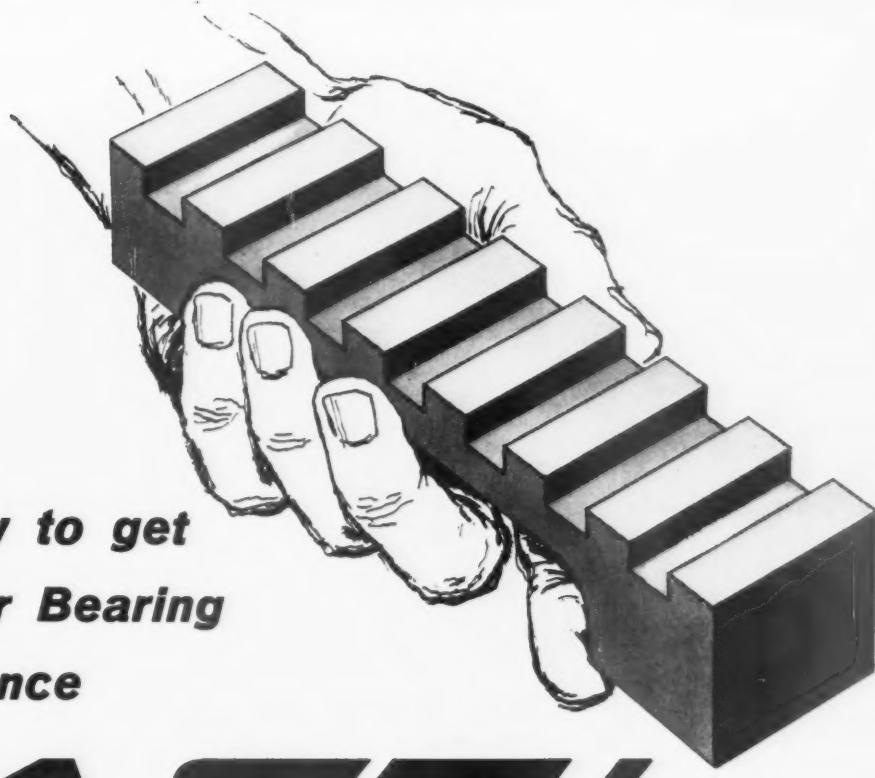


of the connection is the beginning of its destruction. Any loose connection intended to carry high current densities will burn and erode as a result of the arcing which occurs as the loose connection makes contact at random points. On traction motors between 75 and 85 per cent of the total current passes through the brush shunts. If the shunts are removed, the current distributes itself approximately 50 per cent through the spring fingers and 50 per cent through the brush box. A design which would tend to increase the connection resistance will certainly result in pushing more current through the brush box. Since the brush box is a poor or loose connection it seems reasonable to expect that the box wear rate and brush side wear will increase because of arcing between the brush and the box.

The most efficient means of conducting the current to the brush working face is the best. At present, the tamped type connection used on traction motors does the most efficient job, and in the long run it is probably cheaper than other approaches which may eventually cause the replacement of items much more expensive than shunted brushes.

By K. R. MATZ  
National Carbon Company

This is the fourth of a series of questions and answers which are appearing each month.



**Surest way to get  
Better Bearing  
Performance**

# FAST!

**Railroads have accumulated  
30,000 car-months of service  
with R-S JOURNAL STOPS  
— and have averaged  
better than  
6,000,000 car-miles  
per set-out**

**M**AGNUS R-S Journal Stops, bolted to the inside of the box, on either side of the journal, positively prevent excessive axle displacement even under the severest road or switching impacts. All elements of the bearing assembly are kept *in place, all the time!* You maintain a constant hydrodynamic oil film that guarantees optimum journal bearing performance.

Magnus R-S Journal Stops are now installed on more than 2,600 cars which have accumulated more than 30,000 car-months of service. In this time there have been only six road failures. That's equivalent to better than 6,000,000 car miles between set-

outs. You can't beat that kind of performance with any other type of freight car bearing — or any other journal bearing device.

The Magnus aluminum alloy Journal Stop — a new development now being tested — may provide still greater savings to railroads. Use of this new aluminum alloy rather than bronze will cut Journal Stop costs approximately 25% — reducing average initial costs to \$50 or less per car. For full information on our bronze and aluminum Stops, write to Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

**MAGNUS**  
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**MAGNUS METAL CORPORATION** Subsidiary of **NATIONAL LEAD COMPANY**



## PROBLEM PAGE . . .



WHERE THE TOUGH ONES ARE HANDLED

A new question this month. Remember that it pays you to share your ideas and experiences with our readers. Submit letters to the Problem Page Editor.

**DO DIESELS START FIRES?**

**Can the responsibility for track-side fires ever be laid to diesel-electric locomotives?**

*(Discussion continued from the December, 1956 issue)*

**KEEP THEM CLEAN**, by T. J. Meade, Midwestern Area Service Supervisor, Fairbanks, Morse & Co. (At the 1956 meeting of the Railway Fuel and Traveling Engineers Association, during a discussion of diesel operating problems, Mr. Meade answered the following question: What can be done to stop the accumulation of carbon in the exhaust manifold of a 1,000-hp Fairbanks-Morse switcher? When the engine is worked hard on a transfer job, it will throw out large pieces of hot carbon which often set the right-of-way on fire.

Keep the exhaust manifold drains open and, secondly, clean the exhaust port areas at established periods. When I say established periods, I mean that we can't always follow the book on cleaning carbon. An engine in one application may accumulate carbon faster than it would in another application and in each individual case maintenance personnel has to more or less set up its carbon cleaning program to suit the situation as it exists. Carbon may not be a problem at all in some cases.

The main thing that will contribute to carbon accumulation is poor combustion, and anything that we can do to eliminate poor combustion will make it easier to be rid of the carbon. One of the first things we should be sure of is that our fuel injectors are in good shape. Injection and crank-shaft timing should be checked . . . because that, too, contributes to poor combustion.

Another thing that might contribute would be dirt in the air receivers. Quite frequently air intake ports are neglected because they don't very often give trouble. They will accumulate dirt if the air filtration is not kept up to par, so they should be inspected occasionally. Engine air-intake filters should be inspected

*What method has been most successful for cleaning covered hoppers in cement service to determine their light weight, and so that the doors and covers will operate properly? Are special tools necessary? Can car design changes be made in existing cars to simplify the process?*

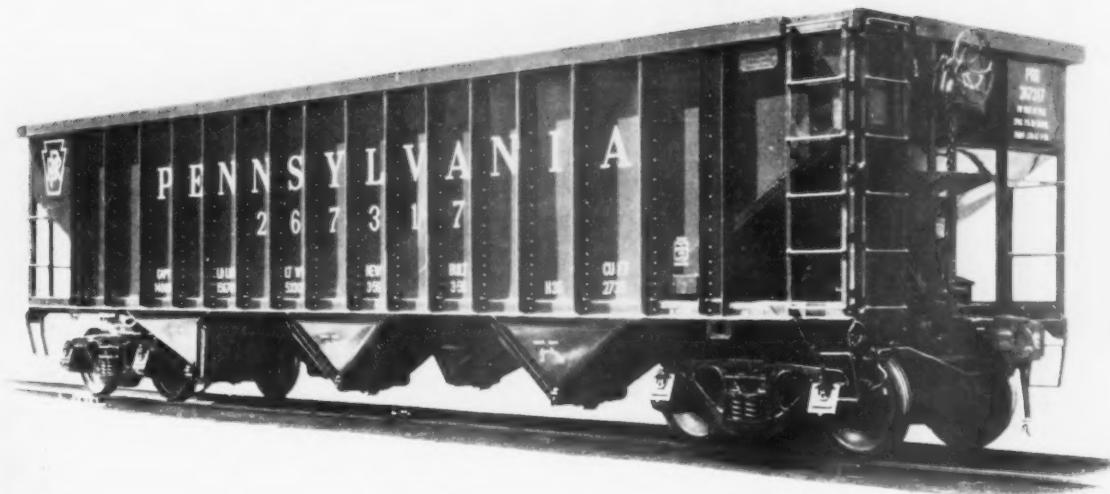
to make sure that they are not restricted. Engine temperature control should be maintained.

In the cleaning of the carbon, the fellows who scrape it off the area where it accumulates [may] leave it lie in the manifold. I personally have never liked that. Then they start the engine up and it will come out in gobs. I think that the loose carbon should be swept out of the exhaust manifold rather than try to blow it out the stack, because that also can start a fire.

**OFFICIAL ACTION.** The following is a notice issued to trainmen and enginemen by one railroad showing steps to be taken in preventing their locomotives from starting fires.—"We have experienced several instances of fires along the right-of-way attributed to deposits being ejected from exhaust stacks on diesel locomotives [and] alighting in dry grass shortly after the train departs from terminal and engine is being worked at full throttle.

"To eliminate this condition on diesel units that have been standing or idling for any length of time, please arrange immediately, if you are not already doing so, to run engines near or at full throttle position for a short period of time just prior to departing train yard in order to clear the exhaust system and stacks of any loose carbon or foreign matter that might have accumulated therein. This practice will eliminate the possibility of such deposits being ejected in critical areas while train is in motion.

"During the dry season when high temperature and low humidity prevail in many sections, engine crews and trainmen should be particularly alert to detect any evidence of excessive spark emission from diesel units and should indicate on Work Report specific unit numbers involved so that corrective action can be taken at maintenance terminals. Excessive spark emission involves ejection of sparks which remain incandescent for a period long enough to reach the ground, as compared to the occasional normal flurries of small particles that quickly extinguish themselves in the air as they rise from the exhaust stack."



## "Pennsy" standardizes on high strength low alloy steels containing nickel for ALL new hopper cars

Pennsylvania Railroad recently received delivery of a fleet of new 70-ton hopper cars.

The high tensile steel plates which contact the lading are expected to last approximately 50% longer than the carbon steel sheets formerly used in hopper cars of this type.

To provide this increased life expectancy, the "Pennsy" is standardizing for all new open-top hopper cars, on the use of high strength low alloy steels containing nickel, for all body sheets which contact the lading.

This policy provides extra strength, wear- and corrosion-resistance without adding to weight. As far as maintenance costs are concerned, the use of high strength low alloy steels permits the "Pennsy" to cut heavy repair work and "out-of-service" time in half.

### High strength low alloy steels are ideal for railroad freight car bodies

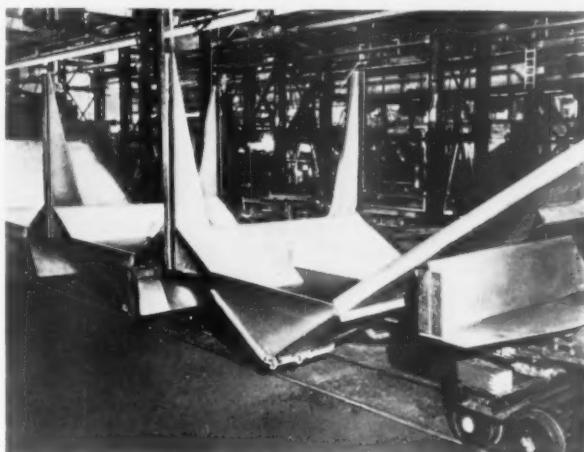
They provide:

- (1) Yield strength of 50,000 psi minimum in the as-rolled condition, which permits either:
  - (a) appreciable weight reduction by using thinner sections . . . or
  - (b) if the same sections are used as for carbon steel, much better durability and minimum maintenance.

(2) Excellent response to usual fabrication operations . . . easy forming . . . easy welding.

(3) Good resistance to corrosion, abrasion and impact.

Send for "Nickel-Copper High Strength Low Alloy Steels." A copy is yours for the asking.



**Stripped down hopper car** shows the high strength low alloy nickel-containing steel sheets used in fabricating the PRR's new triple-hopper type cars. The use of high strength low alloy steels is expected to lengthen car life, reduce maintenance costs and provide greater equipment availability.



**THE INTERNATIONAL NICKEL COMPANY, INC.**

67 Wall Street  
New York 5, N.Y.

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U.S.A.

## Fairbanks-Morse

### Diesel-Electric Locomotives

*This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.*

#### Manipulating Dynamic Brake on Grades

**F555-Q**—What performance may be expected of the dynamic brake on heavier grades?

A—On heavier grades the dynamic brake may be insufficient to hold the train.

**F556-Q**—How is the train speed affected in this case?

A—The train speed will increase and the ammeter pointer will tend to move into the red area.

**F557-Q**—What must be done as above action takes place?

A—Keep moving the handle back to hold the pointer in the white area.

**F558-Q**—What action should be taken when the train speed reaches the maximum authorized?

A—When this happens, make an air brake application to check the train.

**F559-Q**—Should the handle position be changed when the brake application is made?

A—No.

**F560-Q**—What can be done after reducing the speed?

A—Release the air and allow the dynamic brake to hold the train while the brake pipe is being recharged.

**F561-Q**—How does the ammeter pointer perform during the speed changes?

A—When the air brakes apply, the pointer will drop back. After release of the air, train will again gain speed, assuming grade conditions are the same. This will bring the ammeter pointer up again.

**F562-Q**—What should the operation be when the pointer nears the limit of the white zone?

A—The speed will again be at the desired limit and another brake application should be made.

**F563-Q**—What will be the result of this method of handling?

A—A nearly constant speed will be maintained if light air applications are made which will reduce the speed very slightly.

**F564-Q**—Does the movement of the ammeter pointer coincide with the indications as shown on the speedometer?

A—No. Actually, the effect of a light air application will first show as a movement of the ammeter pointer before it is noticeable on the speedometer as a drop in locomotive speed.

**F565-Q**—Under what condition will the speedometer remain practically steady?

A—When the air is released as soon as the ammeter begins to fall back.

## General Motors

### Diesel-Electric Locomotives

*This series of Questions and Answers pertains to General Motors diesel-locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.*

**G619-Q**—What happens when the wheel slipping has stopped?

A—The locomotive will automatically re-apply power after the slipping has stopped.

**G620-Q**—What must be done under extremely poor rail conditions?

A—Repeated slipping should be anticipated and sand applied to prevent it.

#### Indication of a Pair of Wheels Sliding

**G621-Q**—When starting a train, what is the indication of a pair of wheels sliding?

A—The wheel slip light will flash on and off intermittently.

**G622-Q**—What happens as train speed increases?

Manual 2310, Page 227.

A—As the train speed increases, the light will stay on more or less continuously.

**G623-Q**—Will the light go out when the throttle is reduced?

A—No.

**G624-Q**—What takes place when the throttle is closed to idle?

A—The light goes out.

**G625-Q**—If this happens what action should be taken by the engine crew?

A—The engine crew should make an immediate investigation to determine the cause.

**G626-Q**—What may be the cause for wheel sliding?

A—The wheels may be sliding due to a locked brake, a broken gear tooth wedged between the pinion and ring gear, etc.

**G627-Q**—What may be an indication of serious traction motor trouble?

A—Repeated ground relay action, accompanied with unusual noises such as continuous thumping or squealing.

**G628-Q**—What precaution should be observed in case of repeated wheel slip or ground relay action?

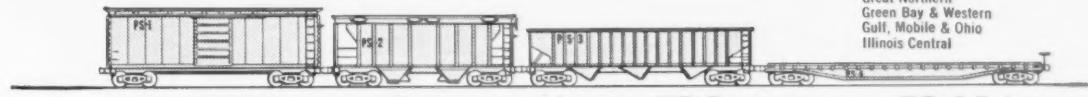
A—Under no conditions should a power plant be isolated and allowed to remain in the consist unless it is certain that all wheels are rotating freely.

#### Trouble Shooting

Manual 2310, Pages 501 to 512 incl.  
Necessary Items To Make Locomotive Operate  
(from operating cab).

**G629-Q**—Name an essential item required in order to have the locomotive operate.

A—The "PCS OPEN" light must not be burning.



**PS-1 box car, PS-2 covered hopper, PS-3 open hopper, PS-4 flat car**

## standardized freight cars

from the experience of the world's largest carbuilder

Pullman-Standard answered all freight car buying questions about service-life, maintenance expectation and shipper-consignee acceptance when it designed, built, tested and then offered the first standardized box car, the PS-1, eleven years ago. Standardization means pre-engineered and tested cars built with the long-run economies and benefits of modern mass production techniques impossible for limited quantity cars. And standardization means thorough, continuous quality proving through exhaustive testing in laboratory and in service.

Recognizing transportation needs for bulk material handling cars, Pullman-Standard worked with railroad users to develop the standardized PS-2 Covered Hopper and PS-3

Open Top Hopper Cars. And Pullman-Standard has recently added the PS-4 all-purpose Flat Car to its standardized line.

The PS-3 Open Top Hopper is all-welded and designed to withstand corrosion and the hard service usages to which hoppers are traditionally put. Built and tested for structural strength, this car allows fast, clean unloading through design and fabrication features.

Railroad management will benefit from investigating the advantages of adding Pullman-Standard Standardized Freight Cars to rolling stock fleets.

For literature and complete details, just call or write the nearest Pullman-Standard Car Manufacturing Company office.

### Relyed on by:

Akron, Canton & Youngstown  
Alabama Power Co.  
Amer. Smelt. & Ref. (Mexico)  
American Sugar Refining  
Ana Arbor Railroad  
Atchison, Topeka & Santa Fe  
Atlanta & West Point  
Baltimore & Ohio  
Bangor & Aroostook  
Bessemer & Lake Erie  
Birmingham Southern  
Boston & Maine  
Maine Central  
Buffalo Creek R.R.  
Canadian National  
Canadian Pacific  
Central Soya  
Central of Georgia  
Central R. R. of New Jersey  
Chesapeake & Ohio  
Chicago, Burlington & Quincy  
Chicago & Eastern Illinois  
Chicago & Illinois Midland  
Chicago & North Western  
Chicago Great Western  
Chgo., Milw., St. Paul & Pac.  
Chgo., Rock Island & Pacific  
Chgo., St. Paul, Minn'pls & Omaha  
City of Chicago  
Clinchfield  
Colo. Mill & Elevator Co.  
Columbus & Greenville  
Copper Range  
Delaware & Hudson  
Delaware, Lackawanna & West'n  
Denver & Rio Grande Western  
Detroit, Toledo & Ironton  
Duluth, Mesabi & Iron Range  
Duluth, So. Shore & Atlantic  
Elgin, Joliet & Eastern  
Erie  
Escanaba & Lake Superior  
Ferrocarril Del Pacifico  
Florida East Coast  
Fl. Dodge, Des Moines & South'n  
General American Trans.  
Georgia Railroad  
Western Railway of Alabama  
Grand Trunk Western  
Great Northern  
Green Bay & Western  
Gulf, Mobile & Ohio  
Illinois Central

Industria e Comercio de Min.  
J. C. Corrigan Co.  
Kansas City Southern  
Lake Superior & Ishpeming  
Lancaster & Chester  
Lehigh Valley  
Lehigh & New England  
La Salle & Bureau County  
Louisville & Nashville  
Maine Central  
Minn'pls, Northfield & South'n  
Minneapolis & St. Louis  
Mississippi Central  
Missouri-Kansas-Texas  
Monon  
National Sugar Refining  
Nashville, Charleston & St. Louis  
New Haven  
New York Central  
N. Y., Susquehanna & Western  
Nickel Plate  
Norfolk & Western  
North American Car Co.  
Northern Pacific  
Oliver Mining Co.  
Pennsylvania  
Phila. Qtz. of Cal.  
Pittsburgh & West Virginia  
Richmond, Fred'bg & Potomac  
Rutland Ry. Co.  
Santos a Jundiai  
St. Louis-San Francisco  
St. Louis Southwestern  
Savannah & Atlanta  
Seaboard Air Line  
Southern Pacific  
Southern Railway  
Tennessee Central  
Texas-Mexican  
Toledo, Peoria & Western  
Union Pacific  
Union Railroad  
U. S. Army  
U. S. Navy  
U. S. Trans. Corps  
U. S. War Department  
Virginian  
Wabash  
Western Maryland  
Western Pacific

WORLD'S LARGEST MANUFACTURER OF FREIGHT AND PASSENGER CARS

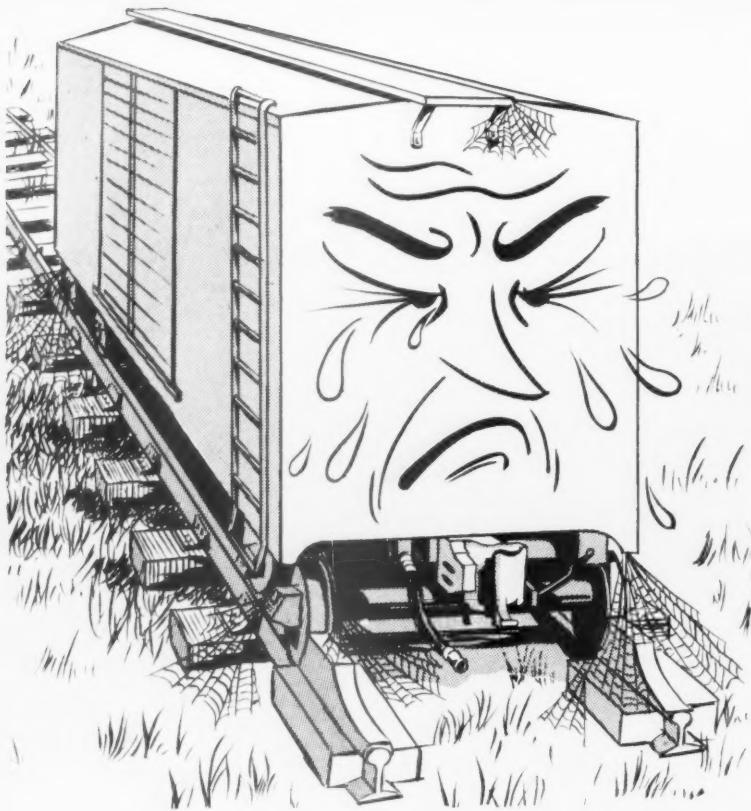
**PULLMAN-STANDARD**

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

221 NORTH LASALLE STREET, CHICAGO 1, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON



**DON'T SIDETRACK OLD BOX-CARS!**

## **NEW, ECONOMICAL METHOD FOR PROFIT UP-GRADING!**

Frequently, after only a short time in service, box-cars are found to be unsuitable for high revenue shipments of grain or meat because of accumulations of fertilizers, oil, soda ash, tar, rancid grain and like residues of past shipments.

Now, however, there's an easy, Economical, PROFITABLE ANSWER . . .

### **MAGNUS SUPERSIL PR**

A solution of Magnus Supersil PR, in water, and applied by one of the new upgraders—or even an ordinary steam gun—does an unsurpassed job of cleaning box-car interiors of even such difficult materials as lamp black or fertilizers. And, it leaves a pleasant odor as well.

Why not ready your box-cars—new or old—for main-line profit?! For full information on this modern Magnus method of upgrading, write to **MAGNUS**, 77 South Avenue, Garwood, New Jersey.



**RAILROAD DIVISION  
MAGNUS CHEMICAL CO., INC.**

—a world-wide organization specializing in cleaning and protection of all surfaces.

### **PERSONAL MENTION**

E&E (Continued from page 14)

Joliet, Ill.



**G. F. Bachman**

**G. F. BACHMAN**, formerly assistant general superintendent of motive power and equipment, Lackawanna, appointed chief mechanical officer. *Born: January 14, 1916, at Cedar Rapids, Iowa. Education: University of Illinois 1939 (BS in Railway Mechanical Engineering). Career: Began as special apprentice in 1937 on the Chicago, Rock Island & Pacific. Became assistant diesel supervisor on the Lackawanna in 1941, subsequently serving as enginehouse foreman, diesel supervisor, master mechanic, superintendent diesel maintenance, and assistant general superintendent motive power and equipment.*

**W. R. WARE** appointed assistant to chief mechanical officer.

**C. G. MAHONEY**, appointed superintendent of motive power, with jurisdiction over locomotive department. Formerly master mechanic at Gary, Ind.

**Pennsylvania**  
Philadelphia, Pa.

**JACOB STAIR, JR.**, electrical engineer, retired.

**JOHN W. HORINE, JR.**, superintendent of locomotive equipment, appointed electrical engineer.

**CARL A. KORN**, appointed superintendent of locomotive equipment, system. Formerly master mechanic at Williamsport, Pa.

**JOHN M. MCGUIGAN**, master mechanic at Baltimore, appointed master mechanic at Williamsport, Pa.

**Virginian**

Princeton, W. Va.

**J. C. FOX**, electrical engineer, retired.

**E. H. WERNER**, assistant electrical engineer, appointed electrical engineer.

**Obituary**

**GEORGE D. MINTER**, retired division car inspector of the Norfolk & Western at Portsmouth, Ohio, died on March 26.

**FRANK V. SHERMAN**, master mechanic of the Louisville & Nashville at Sibert, Ala., died March 11.

**FRANK A. SHOULTY**, who retired as superintendent of the car department of the Chicago, Milwaukee, St. Paul & Pacific at Milwaukee, in 1954, died on March 31.



## Baldwin wheel press assembles wheel sets in as little as 2 minutes

Baldwin and Niles railroad tools are cutting shop costs drastically in the nation's leading railroads. The wheel press pictured above, recently installed in Seaboard Air Line's new shop at Hamlet, N.C., can assemble wheel sets in as little as 2 minutes. Axles and wheels are supplied by gravity racks to the press, which can be fed by one man. One assembly man and a press operator are all the manpower required to process the sets.

The Baldwin wheel press also eliminates substantial installation costs. Due to the fact that the

carriage has its own built-in elevator, the machine can be accommodated by a pit only 6 in. below the floor line—in contrast with pits 6 or more ft. deep required for conventional equipment. Other efficient B-L-H railroad machine tools in operation at Seaboard's Hamlet shop include a new Niles wheel borer with sidehead, a Niles wheel lathe, and a specially designed Niles axle turning and burnishing lathe.

Write today for detailed information on B-L-H railroad machine tools.

**Hamilton Division** Hamilton, Ohio

**BALDWIN · LIMA · HAMILTON**

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools



**START FAST!  
COOL QUICK!**

with **C&D**  
RAILROAD BATTERIES



Use C & D Slyver-Clad\* batteries in your equipment. Why? Because C & D batteries meet all the requirements for rugged railroad service. Each powerful, heavy-duty positive plate has five separate layers of insulation. Because of this famous method of insulation and retention "shedding" is no longer a determining factor in battery life. Thus with C & D batteries you get longer life, higher capacity!

\*T.M. Reg.

**C & D Diesel starting batteries give:**

1. High sustained voltage
2. Reduced maintenance requirements
3. Reduced connection loss

For complete details, write for Bulletin DL-576



**C & D Carlighting and Air Conditioning batteries give:**

1. Lowest annual cost
2. Steady uniform voltage
3. Reduced maintenance requirements

For complete details, write for Bulletin AC-546



**BATTERIES, INC.**  
*of Conshohocken, Pa.*

Industrial Batteries Since 1906

Sales and Service Offices in Principal Cities from Coast to Coast

**Supply Trade  
Notes . . .**



**D. C. Salisbury**

**SIMMONS-BOARDMAN PUBLISHING CORPORATION.**—Duane C. Salisbury, former vice-president and general sales manager, Detroit Colortype Company, has joined Simmons-Boardman as vice-president. Mr. Salisbury, who will be director of sales for the railway division, including Railway Locomotives and Cars, has been active in sales management in the publishing and graphic arts fields for 20 years. While with Colortype, he was sales counsel to the VanderKloot Associated Companies. From 1943 to 1948 he headed advertising sales for the McGraw-Hill Publishing Company's transportation magazine. He was president and general manager of the Carter Company, Detroit, from 1948 to 1955, when he became associated with the Colortype Company.

**C & D BATTERIES, INC.**—Patrick J. Biggan, a former master mechanic on the Rock Island, who has been engaged in railway supply sales in San Antonio, Texas, since 1952, has formed a company known as P. J. Biggan & Associates, representing C & D Batteries, Inc., in Texas, Louisiana and Arkansas.

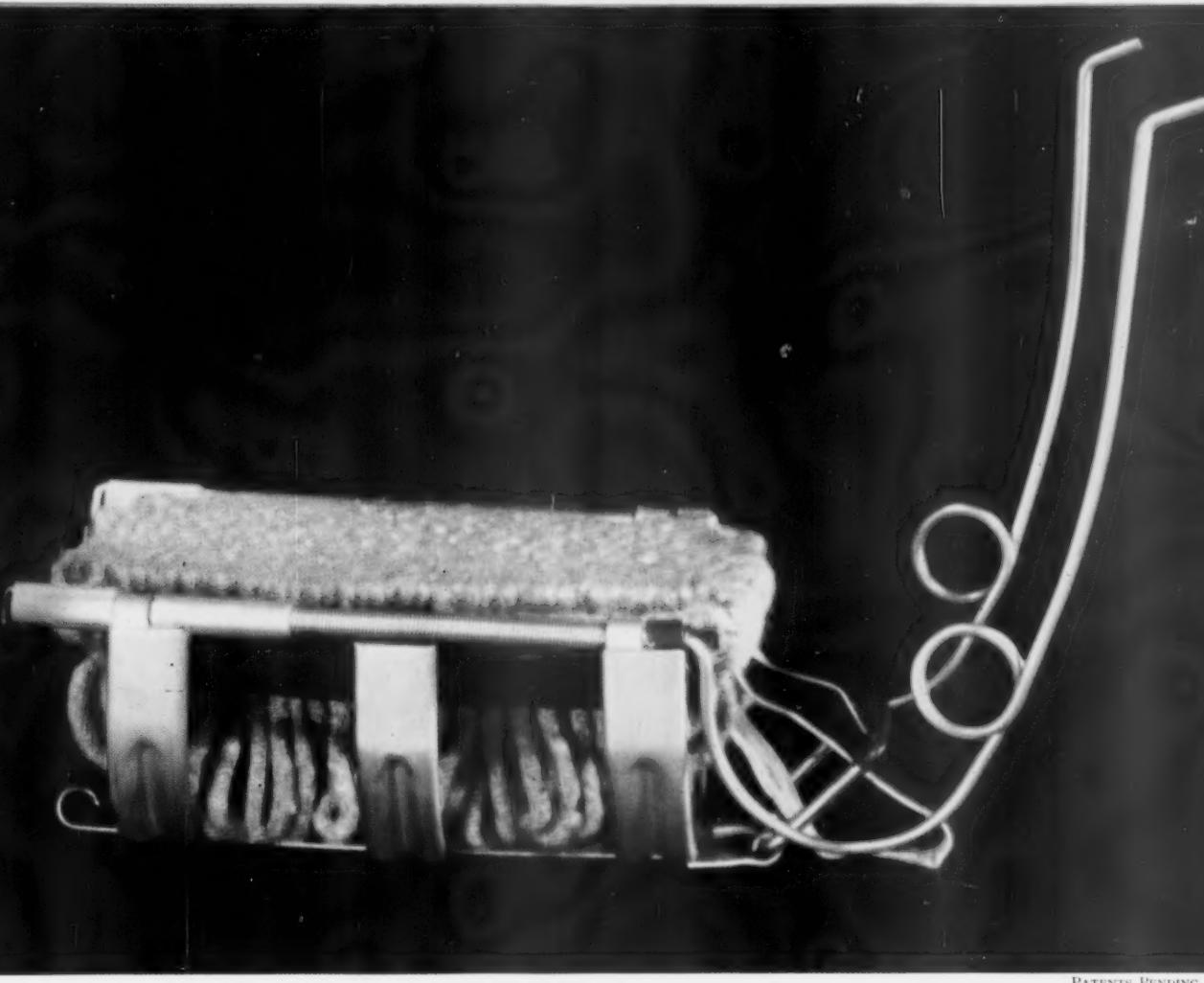
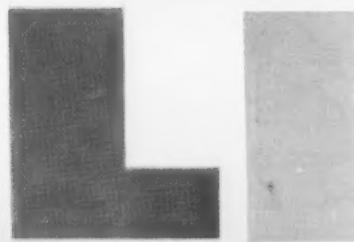
**EQUIPMENT RESEARCH CORPORATION.**—J. E. Shaffer, president of Seaboard Railway Equipment Company, has been appointed sales agent to eastern railroads for Equipment Research of Chicago.

**GRAHAM-WHITE SALES CORPORATION.**—D. Alcott Kelly and associates, who through the Prime Manufacturing Company, have distributed and serviced products of Graham-White Manufacturing Company in the railroad field only, have organized the Graham-White Sales Corporation for the exclusive sales, distribution and service of all products of the company in the railroad and other fields.

**AMERICAN STEEL FOUNDRIES.**—The following members of the Transportation Equipment Division sales department

(Continued on page 68)

# THE LUBRICATING SYSTEM THAT IS CHANGING THE THINKING OF RAILROAD MEN!



PATENTS PENDING

The ROLIN transforms any journal box into a modern, non-mechanical lubricating system in minutes.

The flexible cradle frame fits the curvature of any journal box; holds the pad snugly against the journal.

Spring action holds the cradle in positive position, yet allows the pad to follow journal movements and prevents shock being transferred to the cradle. This flexible design also permits jacking of the box for easy removal of bearings without touching the lubricator.

The unique cord in the pad consists of a tough thread woven around an absorbent inner lining. These endless wicks suspended below the cradle provide a rapid and continuous "pipeline" flow of oil; with a high absorption and retention capacity furnishing a tremendous additional oil reserve.

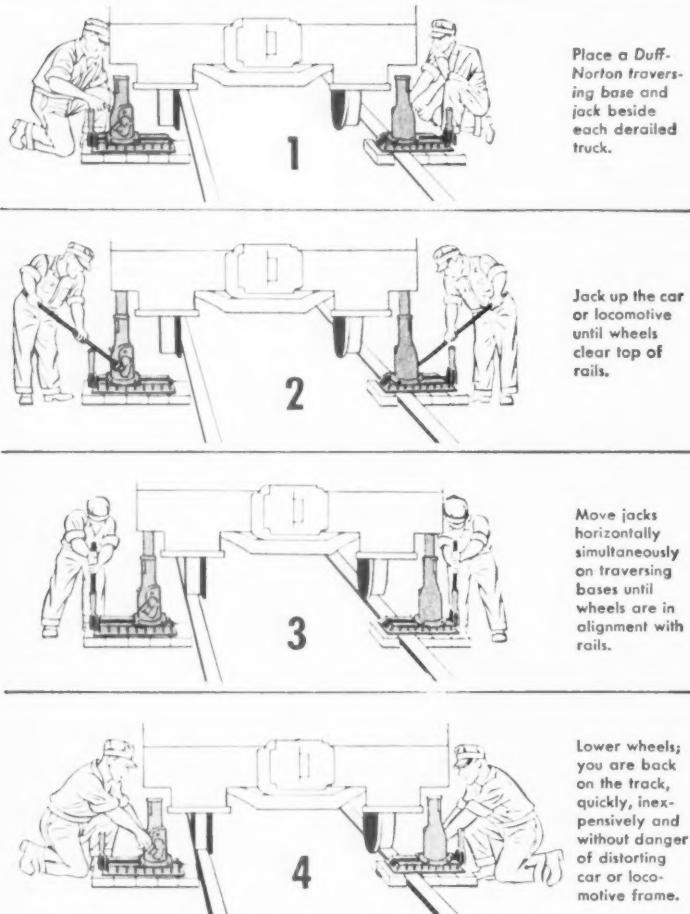
This is the ROLIN . . . designed and engineered to guarantee you freedom from waste grabs, linting, glazing, freezing, oil starvation and other causes of lubrication failures.

*The ROLIN is now in general interchange service on 61 American railroads. For factual data and the truly interesting story of the development of this remarkable device, write:*

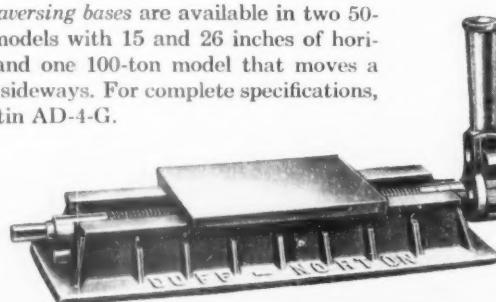
80 EAST JACKSON BOULEVARD • CHICAGO 4, ILLINOIS • WEBSTER 9-3587

THE  
*rolin*  
CORPORATION

**How to get back on the track quickly  
Without A Crane!**



Duff-Norton traversing bases are available in two 50-ton capacity models with 15 and 26 inches of horizontal travel and one 100-ton model that moves a load 20 inches sideways. For complete specifications, write for bulletin AD-4-G.



## Duff-Norton Jacks

**DUFF-NORTON COMPANY**

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

**COFFING HOIST DIVISION:** Danville, Illinois

Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

## SUPPLY TRADE NOTES

(Continued from page 66)

ment of American Steel Foundries have retired: *W. S. Spieth, Sr.*, district sales manager, Chicago and *J. T. Rowbottom*, district sales manager, New York.



J. A. Mustard, Jr.



C. A. Taylor



W. F. Hunt

THOMAS A. EDISON INDUSTRIES, McGRAW-EDISON COMPANY.—*James A. Mustard, Jr.*, has been appointed to the newly created post of regional sales manager, with headquarters in Chicago. Mr. Mustard will supervise the Chicago and St. Louis district offices. *Charles A. Taylor*, has been appointed manager of the Washington, D. C., district office, and *William F. Hunt*, succeeds Mr. Taylor as manager of the Pittsburgh office.

(Continued on page 70)



Why worry about Batteries ...

Specify **gould** and relax



America's Finest!  
GOULD KATHANODE  
BATTERIES  
for Air Conditioning  
and Car Lighting

©1957 Gould-National Batteries, Inc.

*Dependable* battery performance day in, day out is worth more to you than any other single benefit. Right? That's why Gould has carefully perfected the design of Gould Batteries over long test years. Manufacturing techniques at Gould are also the result of patient development, so that today you are assured of maximum power, long life, and trouble-free operation with *every* Gould battery you buy. Ask for new booklet "...so you're going to buy an industrial battery." Write Gould-National Batteries, Inc., Trenton 7, N.J.

Always Use Gould-National Automobile and Truck Batteries *More Power to you from Gould*

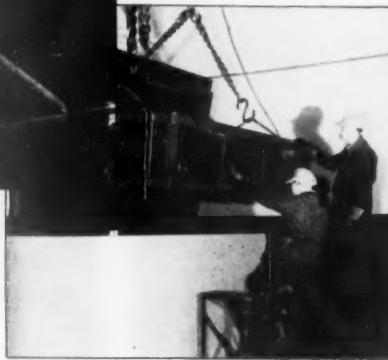
# Tough Parts Cleaned Faster

in **LIX**



Workman inspecting  
Diesel cylinder heads  
after cleaning with  
Lix Diesel Klean Heavy.

The Wabash Shops at  
Decatur, Illinois, get fast,  
thorough cleaning of  
diesel engine parts with  
Lix Diesel Klean Heavy.



## WHY NOT LET **LIX** HELP YOU WITH YOUR TOUGH CLEANING JOBS?

All working parts of Diesel Locomotives, such as Pistons, Liners, Bearings, Lube Oil Coolers, etc., that are sometimes real problems, are cleaned faster and more thoroughly with Lix. Time and hard labor is reduced to a minimum.

No brushing or scraping is necessary. Just soak the parts in Lix and rinse with water or mineral spirits. It is harmless to all types of metals during their cleaning cycle.

A Lix representative will be glad to demonstrate in your shop how he can save you time and money.

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KANSAS CITY, MISSOURI

*"Leadership in Industrial Cleaning"*

## SUPPLY TRADE NOTES

(Continued from page 68)



A. J. McMullen

**GARLOCK PACKING COMPANY.**—Albert J. McMullen has been elected a vice-president at Palmyra, N. Y.

**TIMKEN ROLLER BEARING COMPANY.**—The Buffalo, N. Y., Industrial and Steel Sales office, is being moved from 374 Delaware avenue, to a new building being completed at 2960 Main street.

**UNITED STATES RUBBER COMPANY.**—Carroll C. Parker has been appointed grinding wheels sales manager for the mechanical goods division, succeeding J. A. Fairfield, retired. William J. Reddington has been appointed St. Louis district sales manager for the same division, succeeding Hugh Reynolds, retired.

**UNION CARBIDE CORPORATION.**—The name of the *Union Carbide & Carbon Corp.* has been shortened to the Union Carbide Corporation.

**LINDE COMPANY.**—The name of the *Linde Air Products Company*, a division of Union Carbide, has been shortened to the Linde Company.

**GRiffin WHEEL COMPANY.**—The new Griffin wheel plant at Colton, Calif., has been completed and placed in operation. The plant has a capacity of 120,000 wheels per year.

**ENTERPRISE RAILWAY EQUIPMENT COMPANY.**—W. K. Farmer has been appointed mechanical engineer. Mr. Farmer formerly was chief mechanical engineer of the Chicago & North Western.

**NATIONAL ALUMINATE CORPORATION.**—Dr. J. W. Ryznar has been appointed technical director in charge of general research and development.

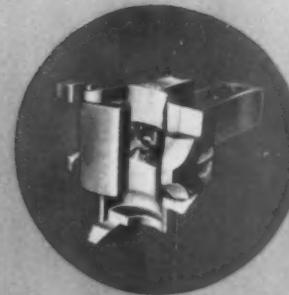
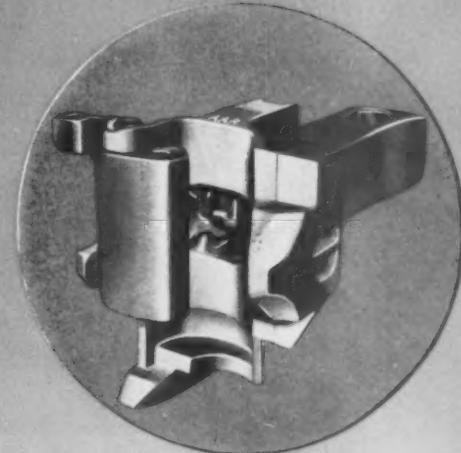
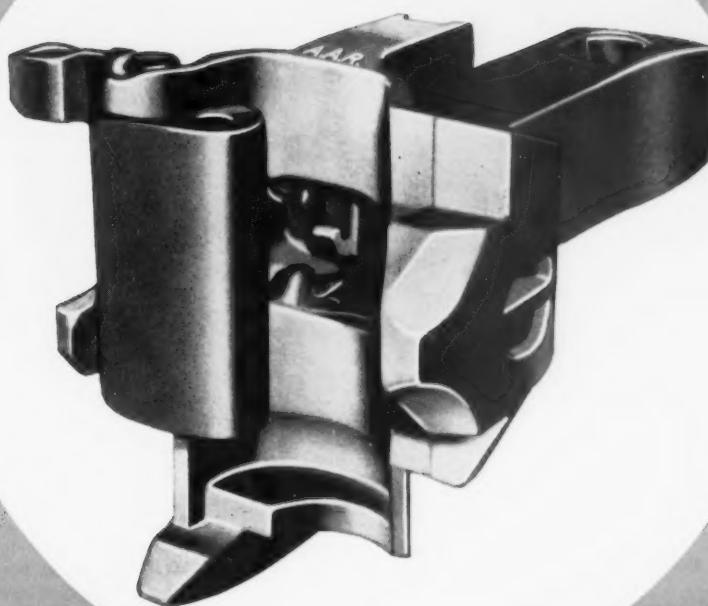
**NATIONAL LEAD COMPANY, MAGNUS METAL DIVISION.**—E. M. Van Winkle, president of the Magnus Metal Corporation, a subsidiary of National Lead, has assumed also duties as general manager of the Magnus Metal Division. (Continued on page 72)

*There's Improved Railroading with  
National Specialties*

*Example:*

# type F couplers

*for freight service*



The Type F coupler was developed for freight service after the proven ability of the highly successful Type H Tightlock coupler in passenger service. 22 per cent stronger than the Type E and with interlocking wings for alignment, the Type F is proving its many advantages in service today. The free slack between knuckles has been reduced to about 50 per cent of that in the E coupler. Another safety factor is the centrally located shelf on the lower front face which serves to support a conventional type coupler in event of a pull-out.

AA-1071



COUPLERS  
YOKES  
DRAFT GEARS  
FREIGHT TRUCKS  
JOURNAL BOXES  
MALLEABLE  
AND STEEL

**NATIONAL CASTINGS COMPANY**

Established 1868

Railway Division Headquarters  
Cleveland 6, Ohio

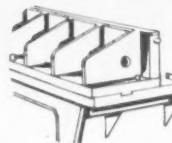
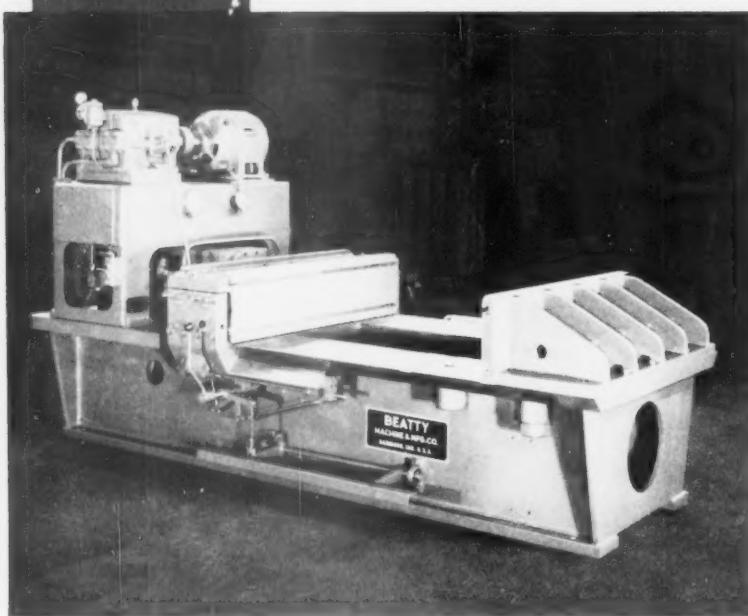
International Division Headquarters  
Cleveland 6, Ohio

Canadian Subsidiary

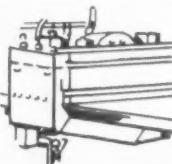
National Malleable & Steel Castings Company  
of Canada, Ltd.  
Toronto 1, Ontario

**BEATTY**  
**HORIZONTAL**  
**HYDRAULIC**  
**BULLDOZER**

## RAPID PRODUCTION & RETURN SPEEDS BOOST OUTPUT



Resistance bolster is keyed and bolted to table for die space change or use of special bolsters.



Ram guides are mounted in V's beneath table surface.

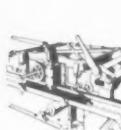
**BEATTY**  
MACHINE & MFG. CO.

962 150th St.  
HAMMOND, IND.

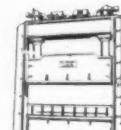
Featuring rapid production and return speeds: advance — 262" per min.; press — 29" per min.; return — 385" per min. . . . this 200-ton Beatty press offers you more dependable, accurate production per man-hour. A compact, self-contained unit, it is very highly regarded for heavy metal working — forming, bending and straightening.

The machine is constructed of rolled steel plate, with a single-acting type main cylinder of high grade forged steel, bronze-bushed and recessed for chevron type packing. Your choice of foot or hand lever controls.

**Write For Full Details**



Spacing Table



Vertical Bulldozer



Heavy Duty Punch

## SUPPLY TRADE NOTES

(Continued from page 70)

succeeding John P. Borda, retired. Other Magnus appointments include John A. Mardick, production manager; G. C. Merritt, assistant production manager, and G. J. Coogan, assistant production manager, in charge of all plant equipment.

**HENRY MILLER SPRING & MANUFACTURING CO.**—I. M. Chambers has been appointed manager of product design and development.

**OCTAGON PROCESS, INC.**—Octagon has appointed the Metalclean Equipment Company 177 Stoneway Lane, Bala-Cynwyd, Pa., as its distributor in the Philadelphia-Camden area, Pennsylvania west to Harrisburg, Delaware and Maryland.

**PULLMAN COMPANY.**—James E. Flannery, general superintendent of shops, has been appointed chief mechanical officer, Chicago, succeeding Harry B. Reed, retired. James R. Mathews, assistant general superintendent of shops, has been appointed assistant to chief mechanical officer, Chicago.

**FAIRBANKS, MORSE & COMPANY.**—R. K. Annis has been appointed development engineer, with headquarters in Chicago.

**ACF INDUSTRIES INC., AMERICAN CAR & FOUNDRY DIVISION.**—Charles F. Venrick, district sales manager, has been appointed vice-president, sales, western region, with jurisdiction over division sales offices in St. Louis, San Francisco and Chicago. Headquarters, Chicago.

**ADANAC SUPPLIES LIMITED; CANADIAN WAUGH EQUIPMENT COMPANY.**—R. L. Lineker, until recently manager, railway department, of Warnock-Hersey Company, Ltd., has been appointed assistant vice-president of Adanac and Canadian Waugh, Montreal.

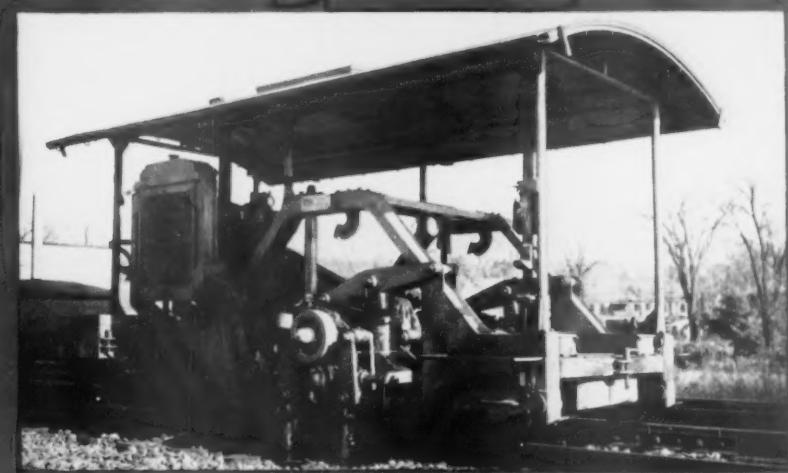
**SERVO CORPORATION OF AMERICA.**—Servo has appointed *Instrument Associates*, Arlington, Mass., as its sales representative in the New England states.

**CHICAGO PNEUMATIC TOOL COMPANY.**—E. S. Rosselle has been appointed assistant sales manager of the railroad division. Mr. Rosselle has been transferred from the Chicago district to Philadelphia, where he will supervise railroad sales in the eastern district. J. R. Ludwig has been added to the railroad division sales staff at Chicago.

**MOTOR WHEEL CORPORATION.**—Motor Wheel, through its national railway sales representative *TZ Railway Equipment Company*, is now the exclusive distributor of Flexo-4 malleable iron journal box lids. Distribution rights were

(Continued on page 74)

# NEW ESSOLUBE HD KEEPS ENGINES CLEANER LONGER... INCREASES POWER, REDUCES WEAR



New Essolube HD is a superior lubricating oil developed for gasoline and diesel engines of the types used in maintenance-of-way equipment. New Essolube HD contains one of the most effective detergent inhibitor additives ever used. It offers new low-temperature detergency and improved high-temperature detergency, plus improved oxidation stability and bearing corrosion resistance.

In extensive laboratory and field tests prior to its introduction, new Essolube HD proved its superior detergency properties. Under low-temperature conditions, Essolube HD markedly reduced sludge deposits. Under high-temperature conditions, piston varnish and top ring deposits were reduced to a new low. Such outstanding engine cleanliness results in *greater engine power, reduced wear, longer life.*

**NEW ESSOLUBE HD** is a versatile oil. You will save on inventory and handling by using it in all your maintenance-of-way equipment — both diesel and gasoline. But most important...there's no danger of using the *wrong* lubricant by mistake.

If you would like more specifics on new Essolube HD, call your local Esso office or write to Esso Standard Oil Company, Railroad Sales Div., 15 West 51st St., New York 19, N. Y.

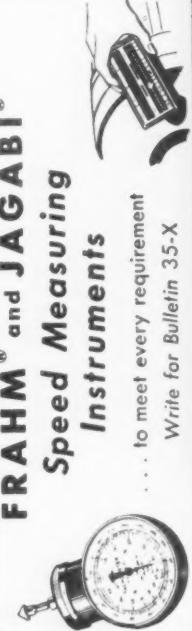


**FRAHM® and JAGABI®**

**Speed Measuring Instruments**

... to meet every requirement

Write for Bulletin 35-X



**MEGGER®**

**Electrical Resistance Measuring Instruments**

... for all electric, Diesel-electric locomotives and other electrical equipment testing requirements.

Write for File RR #1



**JAMES G. BIDDLE CO.**

Electrical & Scientific Instruments

1316 ARCH STREET, PHILADELPHIA 7, PA.

**BE SURE YOU'RE ON THE RIGHT TRACK**

ALWAYS SPECIFY

## SUPPLY TRADE NOTES

(Continued from page 72)

acquired from *National Malleable & Steel Castings Company*, giving Motor Wheel a complete line of journal box lids.

**SAFETY FIRST SHOE COMPANY**—*Lou Kreamer*, district manager has been appointed manager of the railroad sales division, with office at Holliston, Mass.

**FLANNERY MANUFACTURING COMPANY; FORT PITTS MANUFACTURING COMPANY**—*Robert N. Scott* has been elected executive vice-president. Mr. Scott was previously vice-president and director of sales.

**CLEVELAND CRANE & ENGINEERING CO.**—*John G. Frischkorn*, district sales manager for Cleveland Tramrail Division of Cleveland Crane, has been named assistant sales manager at Wickliffe, Ohio.

**TURCO PRODUCTS, INC.**—*Carl F. Graham* has been appointed director of research and development.

**JOHN A. ROEBLING'S SONS CORPORATION**—*Earl A. Frazier*, Cleveland district sales manager has been appointed New York district sales manager for the wire rope and aircord division.



S. V. Malin

**GOULD - NATIONAL BATTERIES, INC.**—*S. V. Malin* has been appointed district manager in Detroit.

**ALCO PRODUCTS, INC.**—The Pittsburgh district office has been moved to Greentree and Cochran Roads in the suburban South Hills section of Scott Township, five miles from Pittsburgh.

**THOR POWER TOOL COMPANY**—The Houston, Tex., office has been moved from 7241 Harrisburg boulevard to 5503 Lawndale avenue.

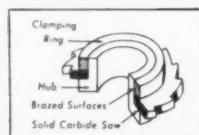
### Obituary

**WILLIAM D. HICKEY**, 69, retired vice-president of the Magnus Metal Corporation, died April 11.

**Now! CLEANER, FASTER COMMUTATOR UNDERCUTTING**

**with the GAY-LEE SOLID CARBIDE SAW**

These undercutting saws, universally used by diesel engine manufacturers and many railroads, are the logical choice for your own maintenance shops. Gay-Lee's patented "One-Unit Design" combines the higher speeds and longer life of a carbide blade with a strong, rigid steel hub for perfect alignment. The solid carbide blade and steel hub are brazed into a one-piece unbreakable unit that will not part during use or re-grinding. Available in "U" or "V" type.



MANUFACTURED UNDER LICENSE  
PATENT NO. 2,422,404

Send diameter,  
arbor size and  
thickness desired  
for quotation.

**GAY-LEE COMPANY**  
CLAWSON • MICHIGAN



## ANTIQUE...OR MODERN...?

In furniture, some still prefer antiques. But in railroads, the trend is definitely toward modern. Sure sign of an up-to-date, progressive railroad—freight cars equipped with **NAILABLE STEEL FLOORING**.

The rugged strength of **N-S-F\*** stands up under the heaviest loads and loading equipment, yet

shows no strain—won't gap or splinter. In fact, **N-S-F** actually strengthens critical points of the underframe, can outlast the car itself. And don't forget, its skidproof surface provides easier loading, greater safety for personnel.

You'll profit in going modern and specifying **N-S-F**.

\***N-S-F** (TM): **NAILABLE STEEL FLOORING**  
Made and sold by



**STRAN-STEEL CORPORATION**

Detroit 29, Michigan • Division of



*Complete engineering and cost data available from our representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis and Atlanta. In Canada, N-S-F is made and sold by International Equipment Co., Ltd., Montreal.*

57-55-20A



**cut  
tool costs  
with**



## **BLACK FINISH RAILROAD WRENCHES**

Here they are . . . "Snap-on Tools dressed in overalls" . . . made to give years of hard service on the toughest jobs you have. Nothing's missing but the expensive chromium finish — in every other respect they're 100% *Snap-on* quality . . . the finest tools that can be built. They're identical with other *Snap-on* tools until they reach the finishing processes. Skipping this operation gives you welcome savings.

Now available in a wide range of socket wrenches and handles, both  $\frac{1}{2}$ " and  $\frac{3}{4}$ " drives. Also in open-end wrenches, long and short combination wrenches, and pliers. *Snap-on's* Railroad Division will be glad to supply complete literature on standard and special railroad tools. Write today.

### **SNAP-ON TOOLS CORPORATION**

Railroad Division

8130-F 28th Avenue • Kenosha, Wisconsin

\*Snap-on is the trademark of Snap-on Tools Corporation.



## **EQUIPMENT**

*(Continued from page 11)*

### **Oil Absorbent Damp-proofing**

Dri-Z-All, an oil and grease absorbent, is available in one lb and 25 lb bags. It is said to be non-caustic, as well as a non-combustible, granular compound. To remove hard-packed grime, the material is sprinkled on, rubbed in with a stiff broom, and then swept up in the usual manner.

Tests have indicated it to be more than adequately free from the possibility of spontaneous combustion. The compound is also recommended by the manufacturer for general damp-proofing and the control of odors, particularly where great quantities of perishable foodstuffs or chemicals are handled. *Diamond Head Oil Refining Company, Dept RLC, 1401 Harrison Tpk., Kearny, N. J.*



### **Miniature Blow Torch**

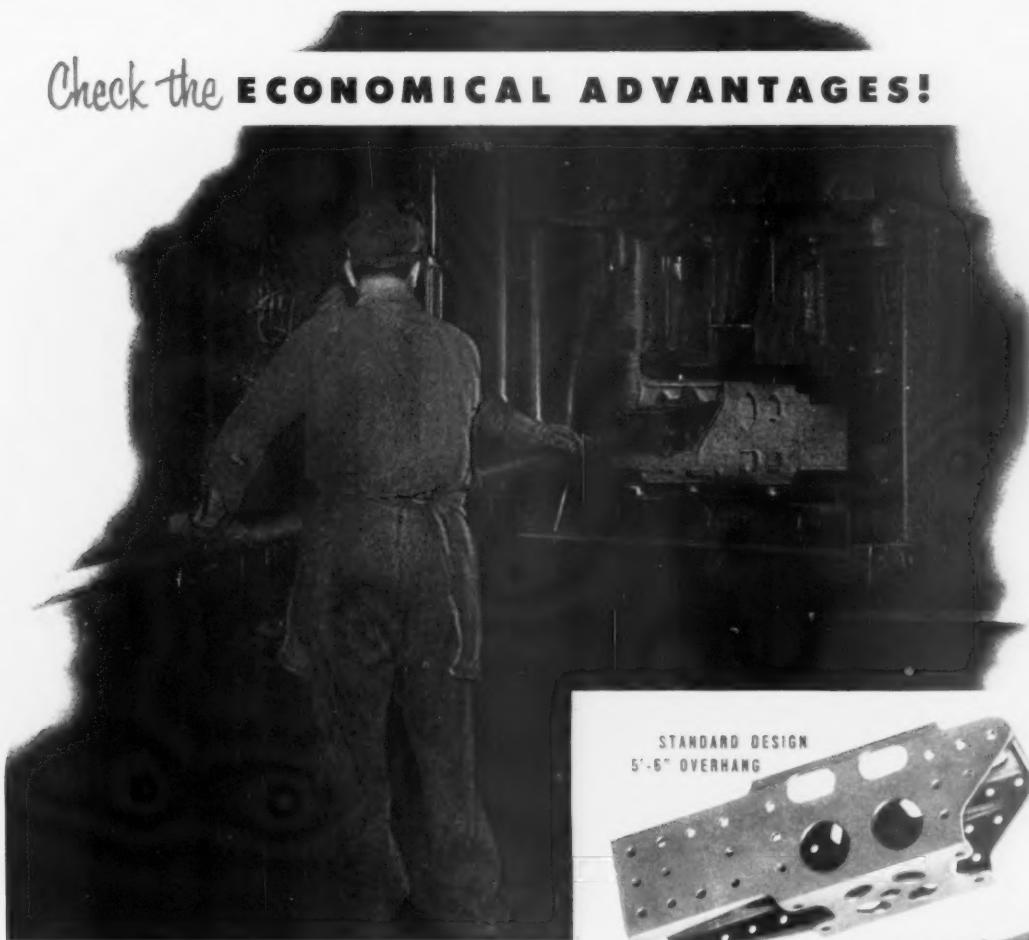
A small gas torch which carries its own fuel supply and which is suitable for small brazing and soldering, has recently appeared on the market. The fuel cartridge, which also serves as the torch handle, contains pressurized gas, one cartridge providing for about 30 minutes operation. The temperature of the flame is approximately 3,500 deg F. Screwing a cartridge into place punctures the cartridge and a quarter turn to the left releases gas to the burner. *Morton Mail Order Company, Dept. RLC, Boonton, N. J.*

### **Strainer**

The Series 137, all-brass strainer is intended for the fine straining of air or gases and is particularly suited for keeping regulators clean. The removable strainer element is of porous bronze, straining out particles .004 in. and larger.

*(Continued on page 78)*

Check the **ECONOMICAL ADVANTAGES!**



# Buckeye

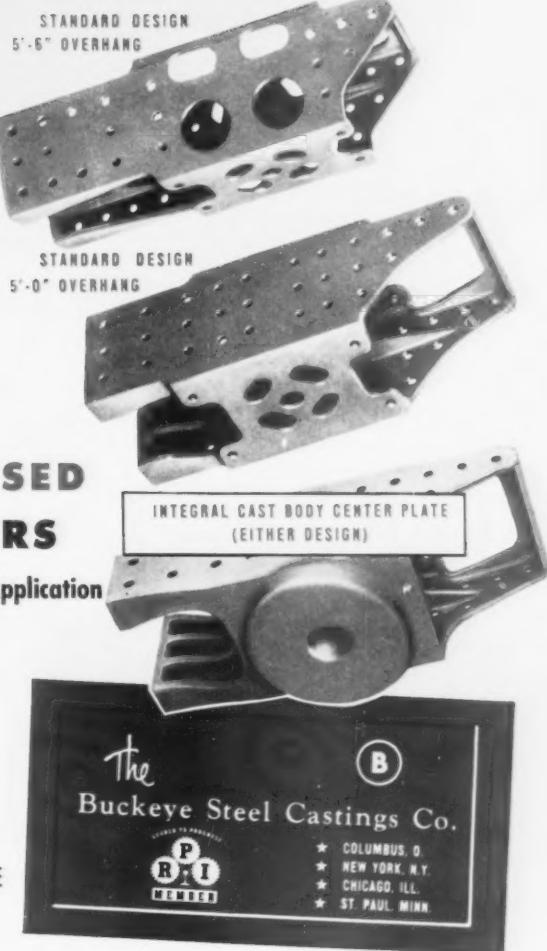
**HOT DIE PRESSED  
BOLSTER CENTER FILLERS**

One or Two Piece Design . . For Riveted or Slot Welded Application

- ✓ NO MACHINING REQUIRED
- ✓ CLOSE TOLERANCES
- ✓ MINIMUM WEIGHT
- ✓ MAXIMUM STRENGTH
- ✓ ALL FIT SURFACES SQUARE
- ✓ ALL RIVET HOLES DRILLED

FOR COMPLETE INFORMATION  
ON STANDARD OR SPECIAL DESIGNS . . CALL OR WRITE

Refer Adv. No. 11871



The  
**Buckeye Steel Castings Co.**



★ COLUMBUS, O.  
★ NEW YORK, N.Y.  
★ CHICAGO, ILL.  
★ ST. PAUL, MINN.



## In CAR WASHING, too

### Oakite gives you low-cost end results

**WHY MAKE A CHOICE** between *optimum* results and *economy* in car washing? With Oakite, you get both. To cite a case:

Unlike the material it replaced in an automatic car washer, Oakite Compound No. 88 thoroughly cut loose all grime, grease and road soil for easy rinse-away without streaking sides and windows. But the real pay-off was in material consumption. By using the more dilute, yet more effective Oakite solution, this railroad saved over \$2600 in the space of a month.

That's why so many Class 1 roads consider Oakite materials as the standard for maintenance cleaning jobs of all types. It's a matter of *better* cleaning at *lower* cost.

56-page booklet tells you "How to make sure of the best in railroad cleaning" by taking full advantage of modern materials, methods and equipment. Write Oakite Products, Inc., 46 Rector St., New York 6, N.Y.

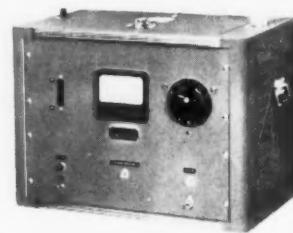


### RAILROAD DIVISION

## EQUIPMENT

(Continued from page 76)

(90 microns). Available in pipe sizes  $\frac{1}{4}$ ,  $\frac{3}{8}$ , and  $\frac{1}{2}$  in. for pressures up to 500 psi. *Watts Regulator Company, Industrial Division, Dept. RLC, Lawrence, Mass.*



### High-Potential Tester

The high-potential testing machine illustrated is capable of developing a-c voltages up to 30,000. It is a new portable bench type designed for testing insulating materials. It has an input of 115 volts, single-phase 50-60 cycle a-c, with a continuously variable output voltage from 0-30,000 volt a-c, at 1 kva, intermittent. It incorporates a  $4\frac{1}{2}$ -in. rectifier type meter calibrated 0.30 kva, and connected directly across the voltage output so that readings are of the actual test voltage applied irrespective of transformer regulation. Other features include a leakage light, with a standard setting at 5 milliamperes, continuously variable output voltage control, and dry-type transformer construction to reduce weight. *Associated Research Inc., Dept. RLC, Chicago 18.*



### Mercury Vapor Floodlights

After 4,000 hours of burning time, a 400-watt mercury vapor lamp, such as the one held by the man in the picture, has an average lumen output of about 75 per cent of the initial rating. In the foreground is shown a new line of (Continued on page 82)

# inspection

*of renovated packing*

# means protection

*from high maintenance costs*

Short ends, fly, lint, snarls, and knots in renovated packing are specifically outlawed by the specifications of the Association of American Railroads. However, some railroad inspectors, after checking into the situation, rejected 50% more renovated packing than was previously discarded. This proves that below-standard renovated packing is still being used.

The condition is being corrected by railroads which have instituted inspection during the renovating process—the only sure way of detecting sub-standard material.

***You can substantially reduce your operating costs by improving the quality of your renovated packing.***

## INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.

Meyer Burstein & Sons, Neenah, Wisconsin

Dallas Waste Mills, Dallas, Texas

The J. Milton Hagy Waste Works, Philadelphia, Pa.

John J. McGrath, Inc., Philadelphia, Pa.

Miller Waste Mills, Inc., Winona, Minn.

National Waste Company, New York, N. Y.

O'Neill Brothers, Inc., Philadelphia, Pa.

The Pittsburgh Waste Co., Inc., Swissvale, Pa.

Riverside Mills, Augusta, Ga.

Royal Manufacturing Company, Perth Amboy, N. J.

Southland Manufacturing Co., Inc., Norfolk, Va.

Twin City Textile Mills Waste Co., St. Paul, Minn.

79



**This diesel will change  
engineers 4,078 times  
before it changes  
Ex-Cell-O pins and bushings**

Ex-Cell-O Pins and Bushings wear longer because of a super-fine finish and a diamond-hard steel casing which resist clinging sand and grit. Because of this a diesel can travel 32 times around the world, changing engineers 4,078 times before Ex-Cell-O Pins and Bushings need replacement. A wonderful service policy backs up every pin and bushing by Ex-Cell-O, too.

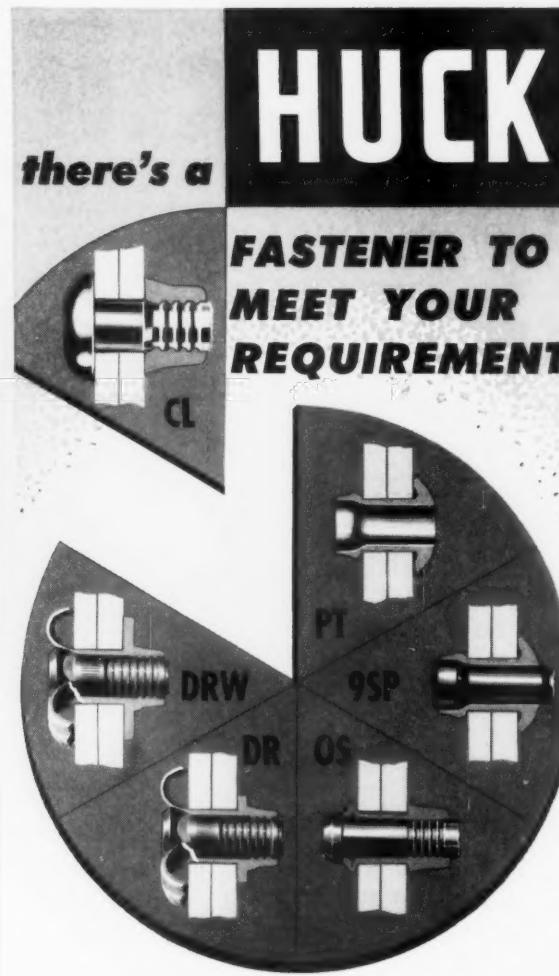
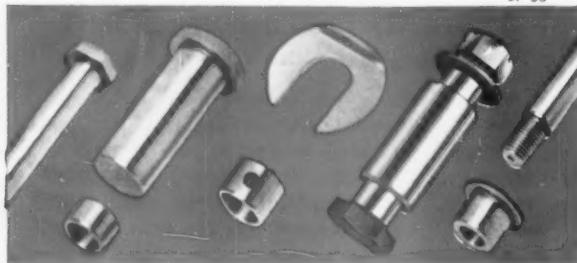
Order directly from the convenient Ex-Cell-O Catalog . . . or contact your Ex-Cell-O Representative.

**EX-CELL-O**  
CORPORATION  
DETROIT 32, MICHIGAN



RAILROAD DIVISION • DETROIT, MICHIGAN • LONDON, CANADA

57-35



Hundreds of manufacturers here and abroad have found the answer to their toughest fastening problems in HUCK'S complete line of commercial, positive-locking rivets.

Huck fasteners are available in many sizes and shapes to meet the many specialized requirements of industry, from railroads to electronic fabrication. Their fast, simple application and positive locking features save production dollars, time and trouble for their many users—producing a better fastening job.

Write or call for a HUCK sales engineer to discuss your problems. There's no obligation.

U.S. Patent numbers 2531048, 2531049, 2754703, 2527307 and patents applied for.



MANUFACTURING COMPANY

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**Sperry**  
**Question  
 and  
 Answer  
 Session  
 on  
 Carbon  
 Brushes**



*that says a lot...about* **QUALITY**

*Sperry Rail Service, Danbury, Connecticut, designers and operators of Sperry Detector Cars, inspect thousands of miles of rail in track for the nation's foremost railroads. Sperry cars have used Speer Carbon Brushes in their rail current generators since 1935.*

*Knowing that there must be some good reasons for long use, we asked the Sperry people to tell us why. Here is their answer:*

"In our operations it is important that every Detector Car have a dependable source of high-amperage, low-voltage current for testing purposes under a wide range of temperature and atmospheric conditions. Our cars have had to test in temperatures from 40 to 50 below zero to over 100 F. In the hot climates the generating compartments on our cars reach temperatures of approximately 130 F. The Speer #688 Brushes with their long life, excellent electrical characteristics and good cleaning action have given us the highest performance at lowest cost possible. We have tried other makes but have been unable to find brushes which compare with the ones we are using."

"In every Detector Car we use Speer #688 Brushes on both Rail Current Generators. One of these is a Chandeysson H8-43 Homopolar Generator from which we take 9,000 amps. at voltages from approximately 1.5v to 2.2v. This generator uses 192 brushes. The other is a Chandeysson BP17 Double Commutator Generator from which we take from 1,500 to 2,000 amps. from each side - double these figures for total output, also at voltages of from about 1.0v to 2.0v. Eighty brushes are used per unit. On this generator the commutator mica is not undercut but left flush with the commutator surface. This requires a hard brush with good cleaning action such as the Speer 688.

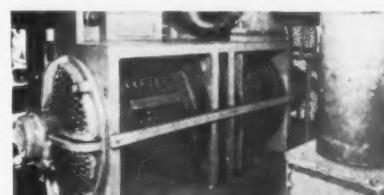
"The Speer Carbon Company representative has maintained close personal contact with us since we started using Speer brushes. To our way of thinking he is the most competent authority on electrical commutation we know."

This is but one railroad customer reaction to one type of Speer carbon brush for railroad use. Speer brushes can do as much for you and there is a type for every kind of railroad application.

*Available for the asking is the book, "Brushes by Speer," which describes the complete line of Speer Brushes.*



Chandeysson BP17-4000 amperes, 2-volt generator uses 64 #688 Speer Brushes



2 Chandeysson H8-43 Homopolar Generators produce 4500 amperes, 2 volts per unit. Each uses 96 #688 Speer Brushes.



**SPEER** *Carbon Co.*  
 St. Marys, Pa.



## TORQUE CONTROL IMPACTOOLS consistently run nuts to prescribed torques

I-R Torsion-Bar Impactools now assure top quality control on these 3 operations:

1. Assembling differential main bearing caps at 450 ft. lbs. both before and after machining as shown above.
2. Preloading differential drive pinion bearing with Impactools set at 375 ft. lbs.
3. Assembling wheels to wheel hubs at 425 ft. lbs.

Quality control has risen to a new high for this large manufacturer of farm equipment since I-R Torsion-Bar Torque Control Impactools were installed.

These Impactools are the *only* power wrenches that deliver full power and speed until the preset torque is reached, and then instantly and automatically shut off.

Now, with Torque Control Impactools, the company consistently runs nuts to prescribed torques, saves time, improves quality and eliminates hand torque checking operations.

Write for Bulletin 5170 for proof of how these amazing Impactools can improve quality and cut costs on your own applications.

**Ingersoll-Rand**  
11 Broadway, New York 4, N.Y.

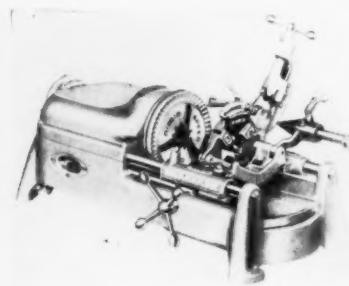
8-524

## EQUIPMENT

(Continued from page 7)

mercury vapor floodlights which give the lighting engineer a wider choice of equipment and enables him to solve many lighting problems with mercury.

The floodlights with new outdoor mercury ballasts and color-improved mercury lamps with an increased longevity and higher maintained lumen output are making mercury floodlighting suitable for a greater diversity of applications. They are available in various types of housings with a choice of beam spreads and beam candlepower, for 250, 400 and 1,000 watt lamps. They are heavy-duty fixtures equipped with a wide or narrow beam reflector. A cast aluminum alloy housing makes the fixtures dust-tight and weatherproof. Protective painting is unnecessary under normal conditions. *Crouse-Hinds Company, Dept. RLC, Syracuse, N.Y.*



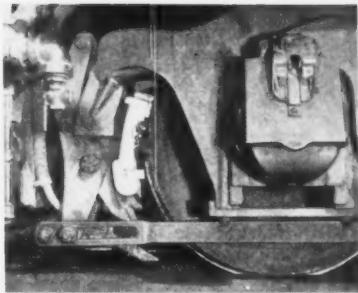
## Threading Machine

The Ridgid 535, pipe and bolt threading machine, has a universal die head, and includes 2 sets of dies to thread  $\frac{1}{2}$  in. to 2 in. pipe or conduit, a roll-type cutoff with self-centering, full-floating cutter wheel, and a five-flute cone reamer with a 2 in. capacity. Operating independently, all tools swing up out of way when not in use.

Machine also has a concealed oil system, lathe-type adjustable carriage handle and a length gage. Allen wrenches, tube of grease, 3 gal of Ridgil and an extra cutter wheel are regularly supplied. *Ridge Tool Company, Dept. RLC, Elyria, Ohio.*

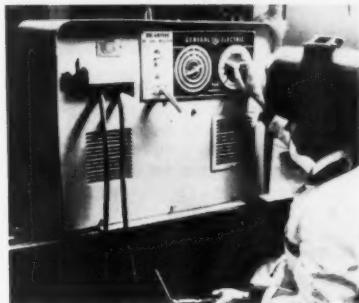
## Flange Cutter

The SD-5 L&M wheel machining apparatus is designed to restore flanges to proper contour with a unit which replaces the brake shoe instead of the brake head which was the arrangement used for this manufacturer's earlier models. The body of this apparatus—its head—is attached to the locomotive brake head with the conventional brake shoe key. In addition to this heavy cast-steel head, each machining appa-



atus includes a set of three heat-treated, tool-steel flange forming tools and the lugs, spacers and tread riders which accommodate different types of locomotives and make possible adjustments during the machining.

The tool can be installed without putting the locomotive over a pit. Moving the tool to another wheel, or making adjustment during cutting can be done on the outside track where the machining is done. Wheel cutting should be done at about 1 rpm, and this can be achieved with some locomotives by blocking the generator field contactor and allowing only the exciter field contactor to close. From 15 to 30 psi brake cylinder pressure should be used. One test showed that with two pairs of wheels equipped with these SD-5's simultaneously, average locomotive out-of-service time per pair of wheels cut was 1.67 hr. Durametallic Corporation, Dept. RLC, 24 Commerce st., Newark, N. J.



### Motor Generator Welders

A new line of motor-generator welders features prelubricated sealed bearings, controlled current peaks and space-saving design.

The driving motors and motor starters on the dual-voltage machines are designed to adapt voltage re-connection without changing overload relay heaters and other accessories. An improved magnetic starter, with a fast response overload relay prevents motor burnout in event of overload. All bearings are rubber-mounted and oversize.

The welders are said to produce the

## small, lightweight air hoist gives you greater VERSATILITY

**Ingersoll-Rand  
AIR-BLOC  
combines  
safety,  
ruggedness  
and  
mobility...**

Move it anywhere . . . hang it anywhere . . . the I-R AIR-BLOC gives you versatility you never thought possible for speedy handling of loads up to 1000 pounds. No mechanical brake to fail . . . load can't drop even if air pressure fails. Responsive throttle control and automatic up-down-stop permit extremely accurate handling. There's a size just right for your job.

Portable winch-type Utility Hoists, in a wide range of sizes up to 4000 lbs., are also available from Ingersoll-Rand.



8-529

#### PENDENT THROTTLE

The only complete line of air hoists with convenient "one-hand" control.

- Speeds spotting of loads.
- Provides "Finger-tip" control over full range of speeds.



same high recovery voltages and controlled current peaks with pop-out-free arcs as engine-driven units.

These units, built with push-button controls, include generator, driving motor and accessories, all in a weather-resistant, self-ventilated case. The compact design permits stacking of welders to reduce floor space.

According to the manufacturer, these new welder-generators can be used for practically all industrial applications including light, medium and heavy d-c metal arc and inert arc welding. *General Electric Company, Dept. RLC, Schenectady 5, N. Y.*

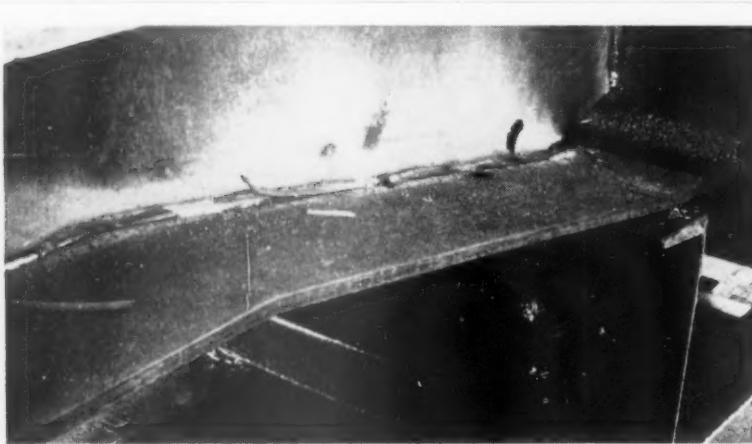


### Aluminum Car Doors

Aluminum baggage car doors, designed to replace steel units twice their weight, are being tested by the Pennsylvania. Eight doors have been installed on two

PRR cars for test. The weight reduction, approximately 166 lb per door, facilitates the opening and closing.

Framework of each door is an all-welded assembly of Alcoa extrusions in alloy 6063-T6. Alloy 3003 sheets, riveted to this framework, forms the facing. The doors are suspended from roller-mounted, cast aluminum hangers. A specially designed extrusion slides along a grooved track in the car floor to guide lower edge of the door. *Aluminum Company of America, Dept. RLC, 1501 Alcoa Bldg., Pittsburgh 19.*



Slag is shown peeling from welds made with "Improved" Fleetweld 47 on car fabrication

### SAVE UP TO 30% OF WELDING COSTS WITH "IMPROVED" FLEETWELD 47

*the iron-powder electrode for high-speed,  
down-hand and out-of-position welding*

By actual comparison "Improved" Fleetweld 47 has been proven superior to conventional E-6013 electrodes.

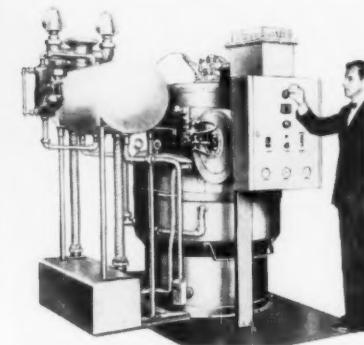
- Deposition rate is 10% to 30% higher
- Up to 30% more weld per rod, resulting in fewer electrode changes and higher operating factor
- Easy operation—no tendency for sticking on AC or DC
- Self cleaning . . . low spatter

You can meet all E-6013 requirements and save money at the same time. Try "Improved" Fleetweld 47 and prove it to yourself.

#### FABRICATORS!

Send for Weldirectory SB-1351 for specifications and procedures on mild steel electrodes.

Write Lincoln Electric Railway Sales Company, 11 Public Square, Cleveland 13, Ohio. Railroad representatives of:



### Water Tube Heating Boiler

The 150-hp drum type Vapor Modulatic water tube boiler is mounted on a steel base plate and is about one-third the size of a conventional boiler of the same capacity. It is designed to produce low pressure steam, 5- to 15-lb pressure for heating industrial plants and commercial buildings. Other models are planned to produce 1,000 to 5,000 lb of low pressure steam up to 125-lb pressure.

Equipped with complete safety controls, this boiler is said to develop steam in 5 min. from a cold start. Hot gases from a forced draft fire, burning oil or city gas, wipe over and around four sets of steel coils heating the water pumped through the coils. Two turbine water pumps recirculate the water from the steam drum through the coils. Steam rising from the drum passes through a specially designed separator located in the drum. The separator removes the excess moisture in the steam before it goes to the steam heating system.

This model is 96 in. high, 80 in. wide and 96 in. long; shipping weight, 7,400 lb. *Vapor Heating Corporation, Dept. RLC, 80 East Jackson blvd., Chicago 4.*

*(Turn to page 86)*

### THE LINCOLN ELECTRIC COMPANY

CLEVELAND 17, OHIO

*The World's Largest Manufacturer of Arc Welding Equipment*

**W**hen  
"Improved"  
Fleetweld 47

**H**as the  
speed of an  
iron-powder rod

**Y**et  
operates in  
all positions

**WHY**  
use anything else  
with mild steel?

# Check list for a customer: to measure the responsibility of a supplier



You expect to purchase good products from any supplier with whom you place an order.

Your own business acumen and experience take care of that. In addition, you expect, and deserve, the things sometimes referred to in contracts as "other considerations". "Other considerations" are a matter of responsibility—the obligation of a good supplier to earn his good name.

This is the first of a series of advertisements in which we are going to look at our business from where you stand—and invite you to share the view.

We want to discuss responsibility—for we believe "responsibility" is the foundation of business. We want to discuss price—what a reasonable price should be in rela-

tion to continually rising material and labor costs.

We'll discuss delivery. The experiences of 1956 verify its importance. And delivery becomes customer-service when it means the same careful attention to orders for repair parts as was given to your original order. Here is where performance after the sale measures the worth of a supplier.

And we'll show how Research and Development challenges the best product to be better with new money-saving products and service.

In the months to come we'll invite comparison—and do it with confidence. Only you can objectively hold the yardstick up.

## STANDARD

RAILWAY EQUIPMENT MANUFACTURING COMPANY

General Office: 4527 Columbia Ave., Hammond, Ind. • New York • Chicago • St. Paul • San Francisco  
Standard Railway Equipment Manufacturing Company, (Canada) Ltd. Sun Life Building, Montreal



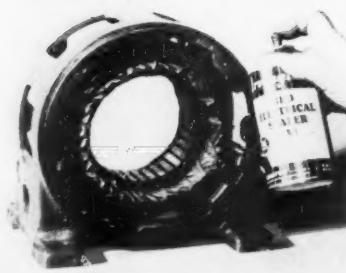
## EQUIPMENT

(Continued from page 84)

### Insulating Varnish Applicators

Two applicator cans for convenient application of electrical insulating enamel have been announced. The container shown is a 12-ounce pressurized can, is designed for spraying of electrical components, motor coils, strators, and commutator ends for protection from moisture, oil and chemicals.

The second container, holding 8 fluid ounces, is fitted with a brush top applicator for brushing on heavier layers of the electrical sealer.



Both contain Irvington brand No. 30 red electrical sealer, an Air-drying enamel which can also be thermoset with a short bake at 200 to 220 deg F. A brush coat air-dries to handle in about three hours and is hard dry after eight hours. The enamel has a dielectric strength of 850 volts per mil and applies at about 5 mils to the coat with a brush. The spray applicator lays down a thinner coating. *Irvington Division, Minnesota Mining & Manufacturing Co., Dept. RLC, Irvington 11, N. J.*

### Car Cleaner

The Mighty-Mulse Special solvent has been developed to remove diesel exhaust stains and road grime from the exteriors of aluminum and stainless steel railroad cars. Producers say it will not attack metals, glass, plexiglas, rubber, or paint. Safety is based on its high flash point of 160 deg F., and its non-irritating, non-toxic characteristics.

Applied by spray or brush, solution is mixed with nine parts of kerosene, allowed about 10 min to work in, and hosed off with cold water. A hot water rinse results in faster drying. *Octagon Process, Inc., Dept. RLC, 27 Bank St., Staten Island 1, N. Y.*

**the NEW miller *MULTI-ARC*  
combination ac-dc welder**

The Miller Multi-Arc combination ac-dc welder, built specifically for metallic arc welding, delivers either ac or dc current at the flick of a switch. Electrical control circuit eliminates mechanical controls. Primary switch is standard equipment; Power Factor Correction optional. Six models from 10 to 525 amperes—all with 60% duty cycle ratings.

Complete specifications sent on request.  
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**miller** Electric Manufacturing Company, Inc.  
APPLETON, WISCONSIN  
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### Draft Gear Features Twin Parts

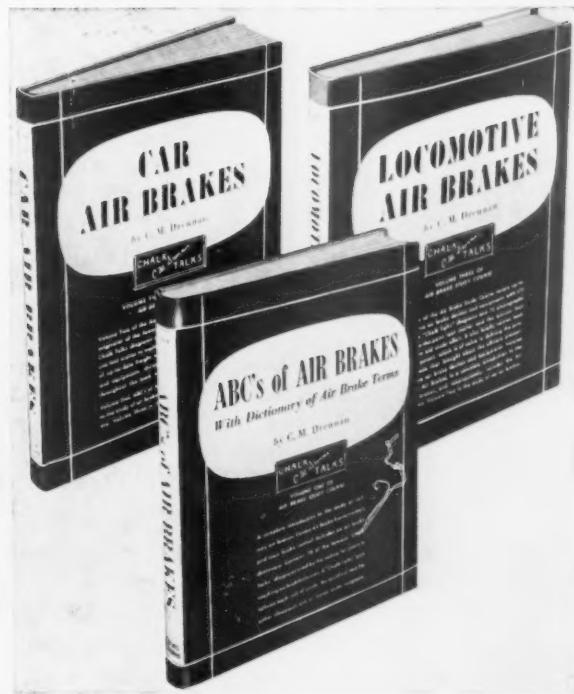
A new design of standard pocket metallic friction freight car draft gear, the Peerless Type T-1, has recently been granted a conditional certificate of approval by the AAR.

Each set of two friction shoes is resisted by its separate spring nest and operates independently of the other. Both sets of shoes are actuated by a common wedge, and during operation both groups work together. According to the manufacturer, this arrangement produces better uniformity of operation, together with high capacity and low terminal forces.

All parts are made from heat-treated high grade steels, insuring maximum durability, it is said, during normal life of device. The housing is alloy cast steel and the friction shoes, wedges and spring caps are drop forgings. The springs are high-carbon spring steel. *Poor & Company, Peerless Equipment Division, Dept. RLC, 332 S. Michigan Ave., Chicago 4.* (Turn to page 88)

# 3-Vol. Complete Air Brake Course

## for apprentice classes or individual study



Written by C. M. Drennan, famed air brake teacher formerly with Westinghouse, these books utilize Mr. Drennan's tested and effective "Chalk Talks" method consisting of clear, simplified "blackboard" drawings that make the function of every part easily understood. Many photographs of equipment are also included. Interspersed throughout all three volumes are quizzes for review and testing of the student's progress.

Vol. 1 (ABC's of Air Brakes) covers friction and braking ratio and freight and passenger train brake control; function and operation of pistons, valves, electric controls and other components. Dictionary of words and terms used in air brake work.

Vol. 2 (Car Air Brakes) covers all car air brake valves and other devices; freight car brakes—AB, ABLC and AC. Passenger car brakes—D-22-P; electro-pneumatic; speed-governor control; Decelostat equipment; universal control. Vol. 3 (Locomotive Air

Brakes) is a thorough exposition of all locomotive brake equipments. Covers air compressors, relay valves and miscellaneous devices. ET equipments and modifications and 24-RL equipment; equipments with electric controls; braking force control.

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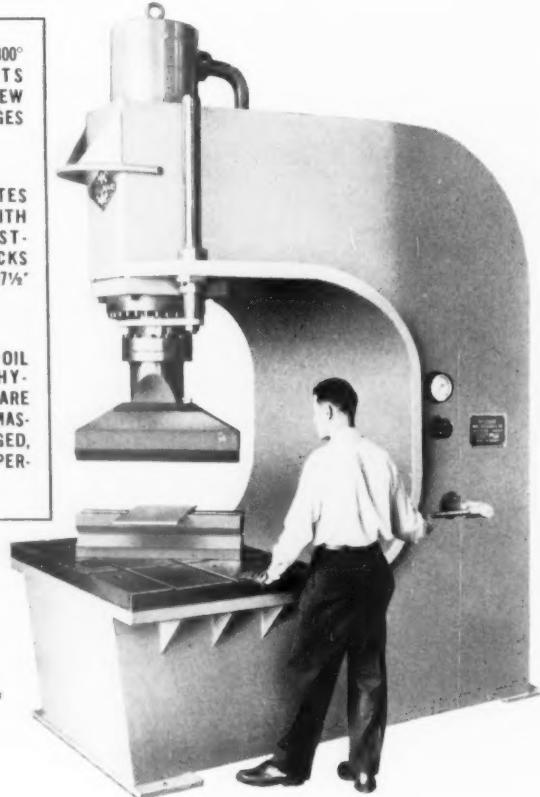
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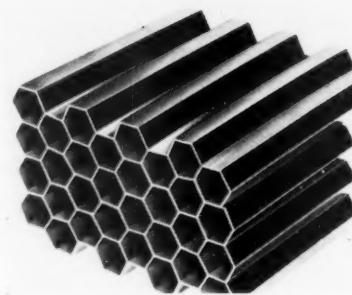
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Write for  
complete data  
and specifications



## EQUIPMENT

(Continued from page 86)



### Journal Lubricator

A journal-box lubricator, said by its manufacturer to be the first to have the rubber honeycombed construction, is designed to outperform waste packing four to five times. The honeycomb acts as a spring to hold the oil-soaked blanket against the journal. This pad of cotton and wool fibers, coated on the underside with Hycar latex to secure the threads, applies the film of oil as the journal rotates. Oil from the bottom of the journal box wicks up by capillary action to keep the blanket wet.

The Hycar honeycomb core, reported as more oil resistant and lower in cost than either sponge or foam rubber, provides resilience in a direction at right angles to the cells, but is rigid in a direction parallel to the cells. This is to permit pushing the pads into the box without bulging or stubbing. Pads are installed without jacking. *Miller Lubricator Company, Dept. RLC, Winona, Minn.*

### Shop Desk

This cabinet-type shop desk has a sloping writing top, a protective hood with pigeon holes and pen holders, a roomy drawer with flat key lock and formed footcaps for each leg. It is designed for stand-up writing jobs, and provides a lock-equipped storage section.

The desk's enclosed lower section is adjustable, and an additional half shelf can be added to double the capacity.

The desk is constructed of steel and is finished in olive green or gray baked-on (Continued on page 90)

# the Original snubber spring

Holland Volute Snubber Springs are NOT  
miniature Draft Gears. They are  
effective Load-Carrying SPRINGS as well as  
highly efficient FRICTION SNUBBING  
DEVICES for Freight Cars.

#### Either 1½" or 2½" Spring Travel

They are easily applied by simply  
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and replacing it with a Holland  
Volute Snubber Spring.



2 1/2" Travel



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VOLUTE SNUBBER SPRING  
IN 40-TON GROUP

Write for New Bulletin #15A  
describing in detail  
the Unit Snubber.

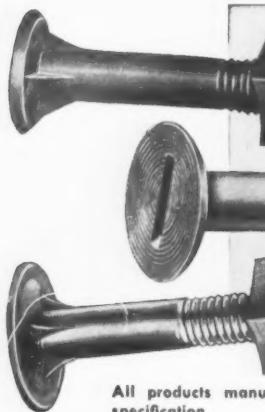


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Each Lewis Sealite car bolt has special "wood engineering" beveled head for flush, moisture tight, fit . . . without countersinking. Standard and large-head car bolts have patented fins that grip wood, prevent turning . . . slotted head bolt can be set with screwdriver. Available in Hot-Dip galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.

Lewis

BOLT & NUT COMPANY  
504 Malcolm Ave. S. E.  
MINNEAPOLIS 14, MINNESOTA



## EQUIPMENT

(Continued from page 88)



enamel. The overall height is 52 1/4 in., width, 33 in. and depth, 28 1/2 in. *Republic Steel Corporation, Dept. RLC, Berger Division, Canton 5, Ohio.*

### Dry Rust Remover

Oakite Drycid, a powdered acid material to remove rust, scale, and corrosion, has been developed for increased safety to metal surfaces and personnel. Added to water in concentrations upwards of eight ounces to the gallon, it is said to go into solution rapidly and to be useful in applications by circulation or immersion. The solution may be used cold or heated to 165 deg F for faster action, and is reported very effective in the removal of scale-like deposits, rust, iron sulphides and other oxides.

The advantages of this new material is its ease in shipment and in storage. It requires no returnable carboys, being shipped in fiber drums. For the workers' comfort this chemical has a mild, aromatic odor and a non-fuming characteristic. Greater safety on aluminum, brass and galvanized surfaces when used as recommended is stressed by its producers. *Oakite Products, Inc., Dept RLC, 146 Rector st., New York 6.*

### HELPS FROM MANUFACTURERS

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

**WIRE ROPE SLINGS.** Three folders suggest applications and ordering specifications for wire rope slings—Uniflex for use where abrasion occurs; Multiflex for maximum load-bearing surface area and ultimate flexibility in one direction, and Maxiflex slings for flexibility in all directions. (Write: *Advertising Dept., Colorado Fuel & Iron Corp.*, Dept. RLC, 575 Madison ave., New York 21.)

**CONTROLLED ARC POWER SUPPLY.** Four-page folder gives details about M&T controlled arc power supply for simplified, faster and more uniform semi-automatic or full-automatic welding. (Write: *Metal & Thermic Corp.*, Dept. RLC, Rahway, N. J.)

**METALLIZING SERVICE.** Bulletin deals with metallizing, a process of spraying molten metals onto a base surface to build up worn mechanical equipment, to apply hard wearing surfaces, to correct surface defects, and to restore dimensions. (Write: *Protective Coatings Division of Metalweld, Inc.*, Dept. RLC, Scotts Lane and Abbottsford ave., Philadelphia.)

**PIPING SYSTEM IDENTIFICATION.** 4-page illustrated manual, No. 117, contains specifications approved by the American Standards Association in conjunction with the National Safety Council and the ASME. Lists colors to be used for each class of fluids and gases, gives size and frequency of legends, and explains the dual methods recommended, by color and legend. (Write: *Rust-Oleum Corporation*, Dept. RLC, 2799 Oakton st., Evanston, Ill.)

**CAR PULLERS.** 32-page Bulletin J-11 describes various types of Jones car pullers for moving freight cars, barges, scrap buggies, etc., also several installations. (Write: *Hewitt-Robins, Inc.*, Dept. RLC, 666 Glenbrook Road, Stamford, Conn.)

**INDUSTRIAL GAS EQUIPMENT.** 24-page catalog (Form 4486—Oxweld Catalog Section 4) describes industrial gas manifolds with automatic controls, also acetylene generators capable of delivering from 100 to 9,000 cu ft of acetylene per hr. Recommended uses and specifications given for equipment for gas piping systems, including hydraulic back-pressure valves, relief valves, station valves, oxygen filters, and station check valves. (Write: *Linde Company*, Dept. RLC, 30 East 42nd st., New York 17.)

**"WROUGHT IRON FOR RAILROADS."** 36-page booklet reviews briefly mechanical and engineering uses of wrought iron in railroad service, with illustrations of some of the more outstanding applications. (Write: *A. M. Byers Company*, Dept. RLC, Pittsburgh 22.)

**LIQUID FILTERS.** 16-page LFC catalog gives complete data for designers and users of equipment requiring full-flow filtration of lubricating, hydraulic or fuel oils. Includes also specific data on gpm, pressure drop, inlet and outlet sizes, weight, overall dimensions and required clearance for cartridge removal for wide range of filter models. (Write: *Air-Maze Corporation*, Dept. RLC, 25000 Miles Road, Cleveland 28.)

**LUBRICATION FITTINGS.** 32-page catalog of lubrication fittings—from the original Alemite "pin type" to the newest "Red Ball" hydraulic type—lists also fittings for special purposes, such as relief fittings, measuring fittings, drive fittings, etc., and accessories, such as bushings, elbow bodies, fitting extensions, plugs, couplers and nozzles, etc., with specifications and dimensions. (Write: *Stewart-Warner Corporation*, Dept. RLC, 1826 Diversey Parkway, Chicago 14.)

## NEWS

(Continued from page 14)

liquid or solid fuel, according to Mr. Wright.

Various solid and liquid fuels for present diesel engines are also under study at the laboratory. The NYC diesel fuel test program (see Railway Locomotives and Cars, October 1956, page 53) is now being conducted on a road locomotive operating between Cleveland and Toledo. The engine is being fired with a "special" oil—a sidestream fuel from the catalytic cracking process. This fuel must be treated with dispersants and heated with engine jacket water for satisfactory combustion, but offers the NYC a saving of 1 cent per gal under the road's present standard "economy" fuel, according to the director. Fuel oil prices quoted were 9.5 cents per gal for the "sidestream" fuel; 10.5 cents per gal for NYC "Economy" fuel, and 11.5 cents per gal for regular diesel oil.

The system-wide use of "economy" fuel already yields a saving of 1 cent per gal and tests have shown that a 1,500-hp freight unit uses 7 gal less fuel per hr at full load because of the higher heat content of the lower grade oil. Problems of handling and burning this oil are solved with proper dispersant treatment which can be confirmed and checked with the NYC's electron microscope, an important tool in the laboratory. The NYC adds its own dispersants.

The possibility of enriching diesel oils with finely dispersed coal particles is being investigated by the NYC as part of an active atomic energy program. According to Mr. Pearlman, the road's atomic interests are twofold: (1) for production of actual power, and (2) as a tool for research and actual applications.

The Canadian government, through the McGill University in Montreal, is also sponsoring a closed-cycle gas-turbine project.

### Gass Predicts 50,000-Car Increase in Freight Fleet

Chairman A. H. Gass of the Car Service Division, AAR, has interpreted first-quarter installations and retirements as indicating that there will be a 50,000-car increase this year in the freight fleet of Class I railroads.

Mr. Gass made this prediction in his latest review of "The National Transportation Situation." He noted that the Class I roads installed 23,265 new cars in this year's first three months when retirements totaled 10,644 cars. First-quarter installations by car-line affiliates of the Class I roads totaled another 1,185 cars.

March installations by those roads and car lines totaled 9,231 cars, more than in any previous month in nearly 5½ years—since November 1951. Their order backlog as of April 1 totaled 99,054 cars.

The serviceable fleet of Class I roads on April 1 totaled 1,650,084 cars, 23,110 cars more than a year earlier.

## NOW! We Can Service Your Traction Motor Field Coils

### WITH EPOXI-MICA INSULATION GIVING

1. HIGH DIELECTRIC STRENGTH.
2. HIGH THERMAL STABILITY.
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New and rebuilt field coils can be supplied cast to pole pieces.

First to service the largest railroads with this EPOXY insulation.

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5408 Harrison St.

Pittsburgh, Pa.

## What's behind the trend to D.C. Hi-Potential Testing?



- Over 20 railroads are now using from one to six TAKK D.C. insulation test sets in daily operations.
- Canadian Pacific, Norfolk & Western, New York Central, Illinois Central, Canadian National, Santa Fe, Southern and Union Pacific are a few of the progressive roads now using these sets.

### THREE BIG ADVANTAGES OF DC TESTING:

- Unlike AC, it shows relative condition of insulation and effectiveness of corrective measures.
- Unlike AC, it will not damage sound insulation.
- Like AC, it fully meets ICC requirements for annual over-voltage tests on all locomotive electrical equipment.

THE TANK 5-KV SET (photo) performs standard resistance and overpotential tests on electrical systems of 5,000 volts and under. Its continuously variable voltage range and accurate and rugged micro-ammeter make it suitable for testing anything from the smallest test sample to the largest traction motor or diesel electric generator. It shows insulation leakage currents likely to be encountered in almost any test from 0.01 micro-amperes to 1.0 milliampere.

SMALL, LIGHT AND RUGGED. The TAKK set combines complete portability (less than 1 foot cube, weighs less than 15 pounds) with accuracy, ruggedness, easy operation and moderate cost. Powered from a standard convenience outlet, it's completely safe for both operator and equipment. For heavy electrical equipment, higher voltage TAKK sets rated at 15, 30 and 45 KV are in widespread use.

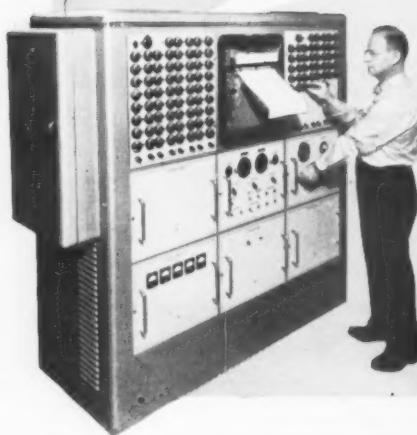
FREE REPRINTS ON DC TESTING give an unbiased picture of advantages. Write today to: The Hewson Company, Inc., 433 Broad St., Newark 2, N. J. Or call HUMboldt 3-3000.

*Prevent Electrical Equipment Insulation Failures with Proved Takk D.C. Test Sets*

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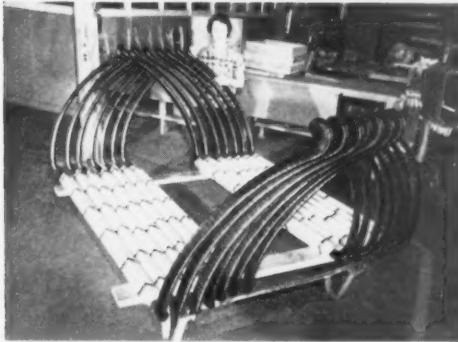
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# National Replacement Coils

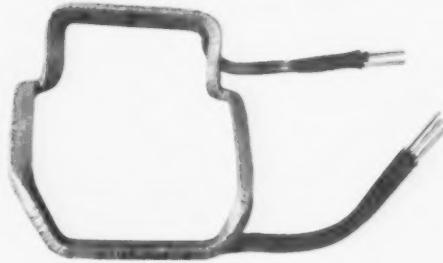
Help Keep Vital Motors and Generators on the Job...

## ...IN THE ELECTRIC POWER INDUSTRY



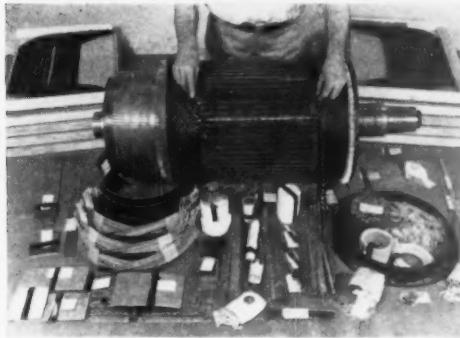
The photo shows part of a set of 54 stator coils for a large AC turbo generator. Rewinding equipment of this size is normally done on the job site. National can furnish the coils and send a full winding crew (or supervisory personnel with the customer supplying the labor), or National can supply the coils only (with the customer handling the complete installation).

## ...IN THE MINING INDUSTRY



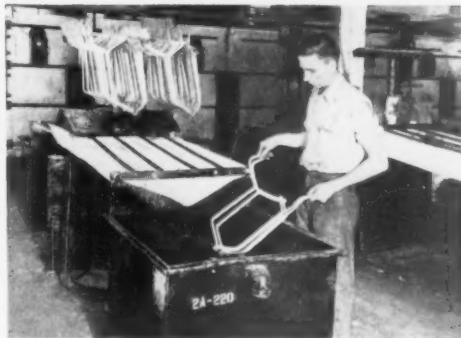
Mines use National coils in the motors which power mine locomotives, shuttle cars, conveyors and other equipment. National "grew up" in the coal fields and really understands the electrical maintenance problems of the mining industry. The photo shows a typical armature coil for a mine locomotive motor.

## ...IN THE RAILROAD INDUSTRY



Some railroads send their traction motors to National shops for rewinding. Others perform the work in their own shops, using National replacement coils and winding supplies. The photo shows the variety of materials which go into a complete National rewinding kit for a traction motor armature.

## ...IN THE STEEL INDUSTRY



The steel industry depends on National for replacement coils because rugged, reliable National coils have proved their ability to meet the test of tough steel mill operating conditions. The photo shows armature coils for a DC mill motor being dipped in a silicone varnish to protect them against deterioration due to high temperatures.

When you need coils for any rotating electrical equipment, you can count on National for top quality, good service and a reasonable price. Ask your National field engineer for details on how National coils can help simplify your motor and generator maintenance problems. If you don't know him, just drop us a line and we'll arrange to have him get in touch with you.

**NATIONAL ELECTRIC COIL COMPANY**

COLUMBUS 16, OHIO, U. S. A.



ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—  
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

# New facts about an old problem, wheel slip—and how to eliminate it

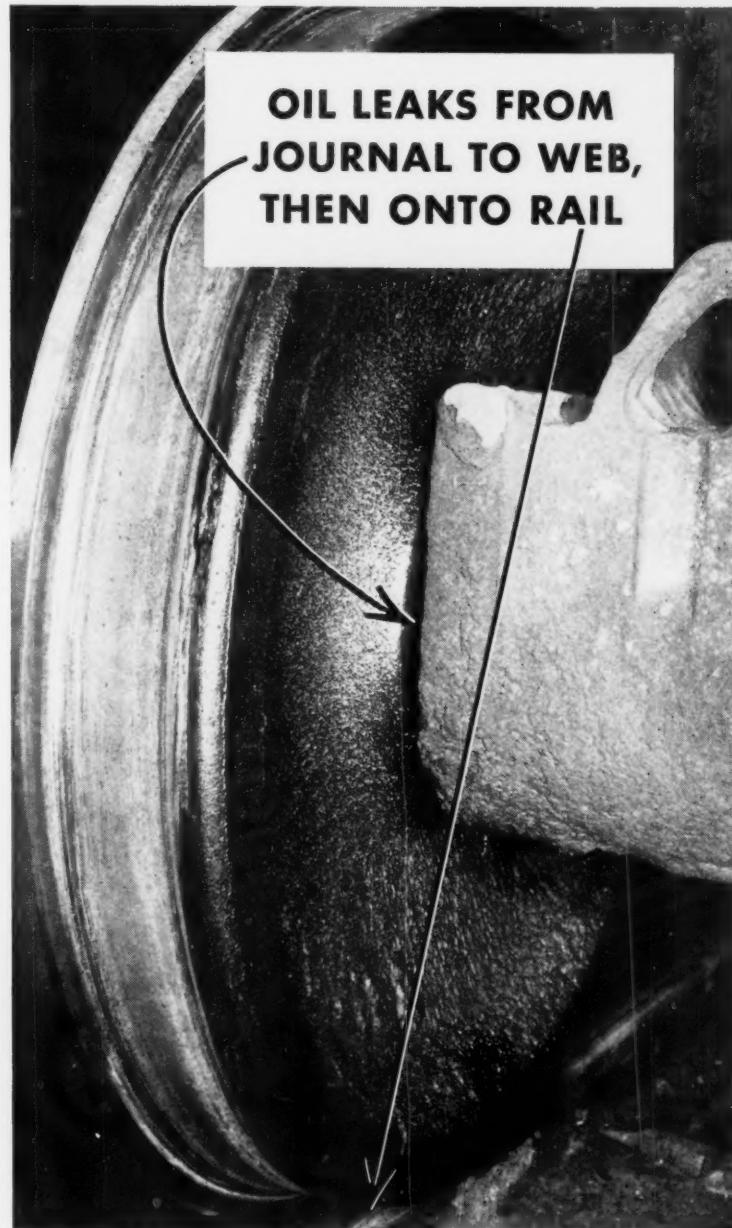
RAILROADS have become increasingly aware of diesel-electric locomotive wheel slip. And they've discovered that a major cause of slip is oil leaking onto the rail from the journals of friction-bearing-equipped freight cars. Oil runs down the wheel web to the tread and is deposited on the rail. And then it is spread over the rail by fog, dew, or light rain.

When a diesel-electric locomotive hits an oily section of track, the driving wheels slip and motor armatures overspeed. This can cause "flashover" in both traction motors and generators and can result in (1) burned-out armatures and loosened windings, (2) locked axles (causing flattened wheels, scored rails and sometimes wrecks), and (3) repairs on locomotive generators and drive motors.

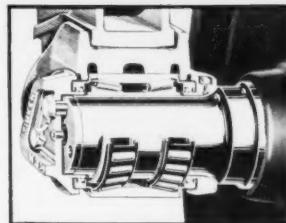
Some railroads are installing "slip indicators". These pinpoint where the wheel slip is occurring. But they can't eliminate the cause.

Timken® tapered roller bearing sealed units prevent lubricant loss. And Timken bearings are normally lubricated with grease, which tends to stay where it belongs. By eliminating this major cause of wheel slip, Timken bearings allow railroads to utilize more fully the greater motive power of diesel-electric locomotives. And they make possible large savings in generator, motor and wheel and rail maintenance costs.

Timken tapered roller bearings eliminate the hot box problem and reduce operating and maintenance costs to a minimum. Now, doing away with the wheel slip problem is still another advantage of Timken bearings. A Timken Company engineer will be glad to show you how. Write, wire or phone, The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".



**TIMKEN**  
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE  
TIMKEN TAPERED ROLLER BEARING TAKES RADIAL  
 AND THRUST- LOADS OR ANY COMBINATION